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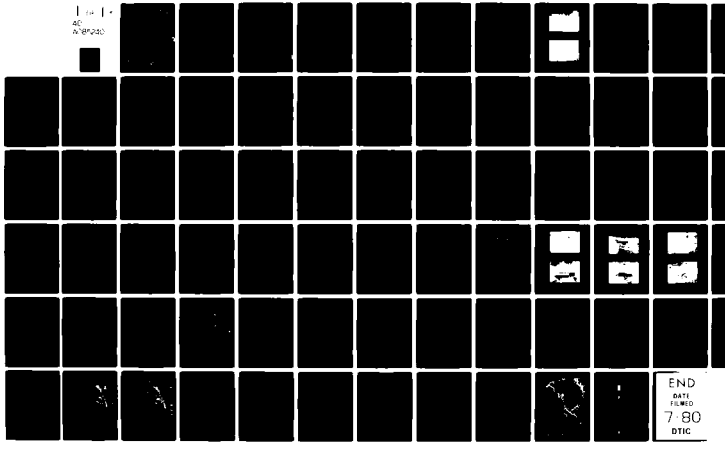

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OHIO RIVER BASIN

UNNAMED TRIBUTARY TO BEAVER RUN, WESTMORELAND COUNTY

PENNSYLVANIA

LEVEL II

National Dam Inspection Program.

GILKERSON DAM

(NDI Number PA-01122

PennDER No. 65-8),

Ohio River Basin, Unnamed Tributary to Beaver Run, Westmoreland County, Pennsylvania.

PHASE I INSPECTION REPORT.

NATIONAL DAM INSPECTION PROGRAM

DACW31-80-C-0020

prepared for

DEPARTMENT OF THE ARMY

Baltimore District, Corps of Engineers

Baltimore, Maryland 21203

prepared by

MICHAEL BAKER, JR., INC.

Consulting Engineers

4301 Dutch Ridge Road

Beaver, Pennsylvania 15009

May 1980

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OHIO RIVER BASIN

GILKERSON DAM
WESTMORELAND COUNTY, COMMONWEALTH OF PENNSYLVANIA
NDI No. PA 01122
PennDER No. 65-8

PHASE I INSPECTION REPORT
NATIONAL DAM ~~SAFETY~~ PROGRAM

Prepared for: DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

Prepared by: MICHAEL BAKER, JR., INC.
Consulting Engineers
4301 Dutch Ridge Road
Beaver, Pennsylvania 15009

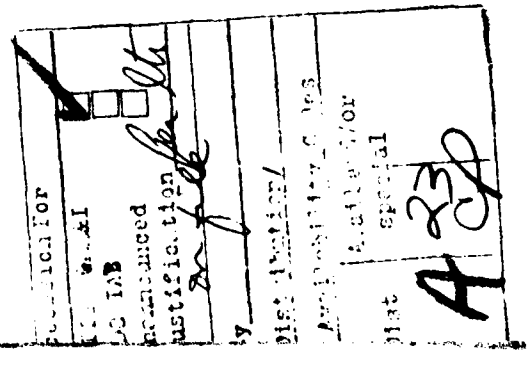
PREFACE

This report is prepared under guidance contained in the "Recommended Guidelines for Safety Inspection of Dams," for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.



PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Gilkerson Dam, Westmoreland County, Pennsylvania
NDI No. PA 01122, PennDER No. 65-8
Unnamed Tributary to Beaver Run
Inspected 18 March 1980

ASSESSMENT OF GENERAL CONDITIONS

Gilkerson Dam, ~~owned by Mr. Milan Martinisko,~~ is classified as a "Small" size - "High" hazard dam. The dam was found to be in very poor overall condition at the time of the inspection.

Hydraulic/hydrologic evaluations, performed in accordance with procedures established by the Baltimore District, Corps of Engineers, for Phase I Inspection Reports, revealed that the spillway will pass approximately 40 percent of the Probable Maximum Flood (PMF) before overtopping will occur. A spillway design flood (SDF) in the range of the 1/2 Probable Maximum Flood (1/2 PMF) to the PMF is required for Gilkerson Dam. The 1/2 PMF was chosen because the dam is on the low end of the "Small" size category. Because the total duration and maximum depth of overtopping during the 1/2 PMF (1.5 hours and 0.21 foot, respectively) did not meet the estimated limiting criteria for failure of the dam (2 hours and 1.0 foot), the spillway is assessed as "inadequate" but not "seriously inadequate". It is recommended that the owner immediately initiate an engineering study to develop recommendations for remedial measures to reduce the overtopping potential of the dam.

The inspection and review revealed certain items of work which should be performed without delay by the owner. Items 1, 2, 3, and 6 below should be completed under the direction of a qualified professional engineer experienced in the design and construction of earth dams.

1) The owner should immediately initiate an engineering study to further evaluate the spillway capacity in order to develop recommendations for remedial measures to reduce the overtopping potential of the dam.

2) The valves on the 10 inch drain and/or 12 inch outlet should be restored to an operable condition. In the future, the operability of these valves should be checked at least once a year.

3) The embankment should be returned to a satisfactory condition through completion of the following

items: the upstream embankment should be regraded and compacted; erosion protection should be provided; all brush and trees should be removed from the embankment; all holes in the embankment should be filled and compacted; the embankment should be seeded with grass and then cut as necessary.

4) The eroded and deteriorated concrete in the spillway should be repaired; the riprap in the lower portion of the discharge channel should be repaired.

5) All soil, vegetation, logs, and other debris should be removed from the spillway, approach channel, and discharge channel.

6) The seep at the bottom of the junction of the right abutment and downstream embankment should be monitored at regular intervals and during periods of high reservoir levels for turbidity and/or increase in flow, which may indicate potential for the piping of embankment material.

In addition, the following operational measures are recommended to be undertaken by the owner.

1) Develop a detailed emergency operation and warning system.

2) During periods of ununually heavy rain, provide around-the-clock surveillance of the dam.

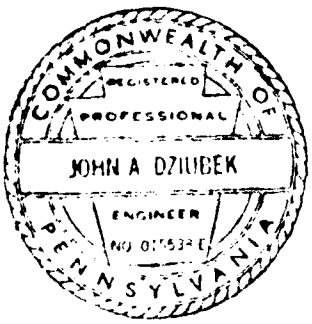
3) When warning of a storm of major proportions is given by the National Weather Service, the owner should activate the emergency operation and warning system.

It is further recommended that formal inspection, maintenance, and operation procedures be developed and implemented.

GILKERSON DAM

Submitted by:

MICHAEL BAKER, JR., INC.



John A. Dziubek, P.E.
Engineering Manager-Geotechnical

Date: 8 May 1980

Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 28 May 1980

GILKERSON DAM

Overall View of Dam from Upstream

Overall View of Dam from Downstream

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APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
GILKERSON DAM
NDI No. PA 01122, PennDER No. 65-8

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority - The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.

b. Purpose of Inspection - The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances - Gilkerson Dam was originally designed as a water supply facility, but it is no longer used for this purpose. The dam is owned by Mr. Milan Martinisko. The dam is an earthfill embankment with a crest length of 283 feet and a maximum height of 19 feet (measured from the original streambed at the toe of the dam to the embankment crest). The design drawings show a concrete core wall extending into the layer of clay which covers the bedrock at the dam site. The core wall is 2 feet thick from its base to Elevation 1013.0 feet Mean Sea Level (M.S.L.). From this elevation to its top at Elevation 1023 feet M.S.L., the core wall is 1.5 feet thick. The upstream and downstream embankments were both designed with a slope of 2H:1V (Horizontal to Vertical). The upstream embankment was originally designed to be covered with riprap between Elevations 1020 feet and 1024 feet M.S.L. The rest of the upstream embankment was originally to be covered with smaller-diameter broken stone. No riprap was observed on the embankment during the inspection.

The spillway, located at the left abutment of the dam, is 19.4 feet long. The entrance channel begins 29 feet upstream of the spillway crest. The spillway crest is at Elevation 1023.0 feet M.S.L. and is formed by a continuation of the concrete core wall. The approach channel is at approximately the same elevation as the crest;

water flowing over the crest drops 2 feet into a rectangular concrete discharge chute which is 39 feet long along its centerline. The downstream half of the chute makes a gradual 45 degree bend to the right. The invert elevation at the downstream end of the concrete is 1017.1 feet M.S.L. There is a 50 foot long trapezoidal riprapped discharge channel immediately downstream of the concrete chute.

The design plans show a 12 inch outlet and a 10 inch drain passing through the embankment near its maximum section. The outlet intake is shown at Elevation 1011.0 feet M.S.L.; the downstream invert of the outlet is shown at Elevation 1003.5 feet M.S.L. The drain intake is shown at Elevation 1008.0 feet M.S.L.; the downstream invert of the drain is shown at Elevation 1005.0 feet M.S.L. The drain and outlet are both constructed of cast-iron pipe embedded in concrete cradles.

A concrete wall 18 inches wide forms the right abutment. This wall runs between the reservoir and a public road adjacent to the reservoir. It extends from the downstream toe of the embankment to a point approximately 100 feet upstream from the embankment centerline. The design elevation of the top of this wall was 1027.0 feet M.S.L. An embankment with a slope of 1.5H:1V was originally to be placed on the reservoir side of this wall. No evidence of this embankment was found during the field inspection.

b. Location - Gilkerson Dam is located in Washington Township, Westmoreland County, Pennsylvania, approximately 1.6 miles south of Vandergrift, Pennsylvania. The dam was constructed across an unnamed tributary to Beaver Run. The coordinates of the dam are N 40° 34.2', W 79° 34.7'. It can be found on the Vandergrift, Pennsylvania, USGS 7.5 minute topographic quadrangle.

c. Size Classification - The maximum height of the dam is 19 feet and the reservoir volume to the top of the dam is 36 acre-feet at Elevation 1026.2 feet M.S.L. Therefore, the dam is in the "Small" size category.

d. Hazard Classification - Pennsylvania Route 66 is located 400 feet downstream of the dam and would be damaged if the dam were to fail. There are also two homes located immediately downstream from

the dam; loss of life is considered likely in the event of a dam failure. Therefore, Gilkerson Dam is considered to be in the "High" hazard category.

e. Ownership - The dam is owned by Mr. Milan Martinisko, R.D. 5, Box 337, Apollo, PA 15613.

f. Purpose of the Dam - The dam was originally built to provide an auxiliary water supply for the Apollo Waterworks Company. The dam is no longer used for this or any other purpose.

g. Design and Construction History - The dam was designed by Mr. W.C. Hawley, General Superintendent of the Apollo Waterworks Company, who was also in charge of construction. The construction was started in June 1913 and was completed by June 1914.

h. Normal Operating Procedures - Normal pool elevation is 1023.0 feet M.S.L. and is maintained by the crest of the spillway. There are no formal operating procedures for this dam.

1.3 PERTINENT DATA

a. Drainage Area (square miles) - 0.34

b. Discharge at Dam Site (c.f.s.) -

Maximum Flood -	Unknown
Total Ungated Spillway Capacity (El. 1026.2 ft. M.S.L.) -	343

c. Elevation (feet above M.S.L.) -

Design Top of Dam -	1027.0
Minimum Top of Dam -	1026.2
Average Top of Dam -	1026.6
Normal Pool (Spillway Crest) -	1023.0
Maximum Design Pool -	Unknown
Outlet Pipe - Invert at Entrance -	1011.0
Invert at Exit -	1003.5
Drain Pipe - Invert at Entrance -	1008.0
Invert at Exit -	1005.0
Original Streambed at Toe of Dam -	1008±
Maximum Tailwater -	Unknown

d. Reservoir (feet) -

Length of Maximum Pool (El. 1026.2 ft. M.S.L.) -	1080

Length of Normal Pool
(El. 1023.0 ft. M.S.L.) - 970

e. Storage (acre-feet) -

Minimum Top of Dam
(El. 1026.2 ft. M.S.L.) - 36
Normal Pool (El. 1023.0 ft. M.S.L.) - 22

f. Reservoir Surface (acres) -

Minimum Top of Dam
(El. 1026.2 ft. M.S.L.) - 5.0
Normal Pool (El. 1023.0 ft. M.S.L.) - 3.6

g. Dam -

Type - Earthfill embankment
Length (feet) - 283
Height (feet) - Design[1] - 19
Field[2] - 15.1
Top Width (feet) - 10
Side Slope - Upstream - 2H:1V (from design plans)
Downstream - 2H:1V (measured)
Zoning - Unknown
Core Wall - The design drawings (see Plate 3) show a concrete core wall extending several feet into a layer of clay. The core wall is shown as 2 feet thick from its base to Elevation 1013 feet M.S.L. From that elevation to its top at Elevation 1023.0 feet M.S.L., it is shown as 1.5 feet thick.
Grout Curtain - Unknown
Drains - The only drain shown on the design drawings is a 6 inch terra cotta pipe laid under the downstream portion of the spillway discharge channel.

h. Diversion and Regulating Tunnel - None

i. Spillway -

Type - Broad crested weir
Length of Crest Perpendicular
to Flow (feet) - Design - 20
Field - 19.4

[1]Measured from the original streambed at the toe of dam to the embankment crest.
[2]Measured from the toe of the downstream embankment to the embankment crest.

Crest Elevation (feet M.S.L.) - 1023.0
Gates - None
Upstream Channel - The upstream channel is at approximately the same elevation as the spillway crest. It is approximately 30 feet long and is lined with riprap.
Downstream Channel - Downstream of the spillway weir there is a 2 foot drop into a rectangular concrete chute 39 feet along its centerline. The downstream half of this chute makes a gradual 45 degree bend to the right. Immediately downstream of the chute there is a 50 foot long, trapezoidal, riprapped discharge channel.

j. Regulating Outlets - A 10 inch drain and a 12 inch outlet pass through the embankment. Both consist of a cast-iron pipe imbedded in a concrete cradle. They are both controlled by valves located below the toe of the embankment.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

Gilkerson Dam was designed by Mr. W.C. Hawley, General Superintendent of the Apollo Waterworks Company. The following information was reviewed for this inspection report:

1) The design drawings entitled "Apollo Waterworks Co., Impounding Reservoir for Clear Water on Gilkerson and Ludwig Properties," dated February 1913.

2) Report entitled "Report on the Application of the Apollo Waterworks Company for Permission to Construct a Dam on a Tributary of Beaver Run, near Apollo, Armstrong County, Pennsylvania," prepared by Mr. Charles E. Ryder of the Water Supply Commission of Pennsylvania, dated 2 May 1913.

3) Various correspondence relating to the dam's design, and inspection reports completed by representatives of the Pennsylvania Department of Environmental Resources' (PennDER) predecessor, the Water and Power Resources Board.

2.2 CONSTRUCTION

Construction was carried out under the general supervision of Mr. W.C. Hawley. Construction began in June 1913 and was completed by June 1914.

2.3 OPERATION

Normal pool Elevation is 1023.0 feet M.S.L. and is maintained by the crest of the spillway. There are no formal operational procedures for this dam.

2.4 EVALUATION

a. Availability - The information reviewed consisted of the PennDER File No. 65-8 on the dam.

b. Adequacy - The information available is adequate for a Phase I Inspection of this dam.

c. Validity - There is no reason or indication at the present time to doubt the authenticity of the available engineering data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General - The visual inspection of Gilkerson Dam was performed on 18 March 1980. The pool at the time of the inspection was at Elevation 1023.6 feet M.S.L., with 0.6 foot of water flowing over the weir. At the time of the inspection, the dam and its appurtenances were considered to be in very poor condition. Noteworthy deficiencies observed during the inspection are described briefly in the following paragraphs. The visual inspection check list, field sketch, top of dam profile, and typical cross-section are given in Appendix A.

b. Dam - The surface of the downstream embankment is very irregular, but no obvious areas of sloughing or erosion were found. The dam crest and upstream embankment are severely eroded. There are several areas where the embankment has eroded from the reservoir all the way back into the crest; in some of these areas there is a vertical drop from the crest to the water. No riprap was found anywhere on the embankment, although the design plans show that the entire upstream embankment was to be covered with 8 inches of broken stone, with riprap between Elevations 1020 and 1024 feet M.S.L. The entire embankment is covered with a heavy growth of brambles, reeds, and small-to-medium size trees. Below this cover, most of the embankment surface is bare; there is very little grass cover on the embankment. Two rodent holes were found: one near the center of the downstream embankment and one on the crest approximately 50 feet to the right of the spillway.

A clear seep (estimated flow rate 10 g.p.m.) was found at the bottom of the junction of the right abutment and the downstream embankment. The entire toe of the dam and a large area downstream of the right side of the embankment were very wet, with numerous pools of standing water. An extensive growth of cattails and other marsh plants downstream of the dam indicates that this area is usually very wet.

Except for the seep at the bottom of the junction of the right abutment and the downstream embankment, the junctions of the abutments and embankment appeared to be in good condition with no evidence

of slumping or erosion. The junction of the spillway and dam also appeared to be in satisfactory condition.

c. Appurtenant Structures - The design plans show two cast-iron pipe outlets, one 10 inches and the other 12 inches in diameter. The only portions of these outlets that could be found during the inspection were the valve stems, located below the toe near the midpoint of the dam.

The control section of the spillway is a concrete weir 19.4 feet long (perpendicular to the flow). At and just above the control section, the concrete in the left half of the spillway and on the training walls is badly deteriorated and eroded. The left quarter of the spillway is filled with soil out of which bushes and small trees are growing. The left half of the riprapped approach channel is filled with soil out of which bushes and small-to-medium size trees are growing. The rest of the approach channel is almost completely blocked with a large number of floating logs.

Water flowing over the control section drops approximately 2 feet into a curving concrete chute 39 feet long, then flows into a riprapped trapezoidal channel 50 feet long. The discharge channel is partially filled and blocked with small logs and other debris. The riprap in the trapezoidal portion of the channel is badly deteriorated.

The right side of the embankment ends at an 18 inch wide concrete wall which rises to approximately the same elevation as the dam crest and separates the dam from a public road that runs along the reservoir. This wall is approximately 5 feet high at the centerline of the dam and extends upstream approximately 100 feet. The design plans indicate that an embankment was to be placed on the reservoir side of the wall and extend upstream 50 feet beyond the end of the wall; during the inspection no sign of this embankment was found.

d. Reservoir Area - During periods of high reservoir levels, a large amount of water will flow around the end of the wall discussed in the preceding paragraph and then down the road on the right side of the reservoir. There are several houses on the slopes on the other side of the road, well above the reservoir. The land on the left side of the reservoir is wooded and moderately sloped.

A large amount of sediment has accumulated in the reservoir. Currently, the reservoir is an average of 4 to 5 feet deep as compared with the original average depth of 10 feet.

e. Downstream Channel - State Route 66 crosses the downstream channel approximately 400 feet downstream of the dam. The culvert under the road consists of a concrete box culvert approximately 4 feet by 4 feet. It is likely that the road would be overtopped in the event of a large discharge from the reservoir. There are some bushes growing along the channel, but the channel itself is clear of obstructions.

There are two houses lower than the dam within a few hundred feet downstream. Loss of life is probable in the event of a dam failure.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

Currently there are no formal written procedures in the event of impending failure of the dam. The condition of the dam is not checked on a regular basis.

It is recommended that formal operating procedures be prepared, prominently displayed, and furnished to all operating personnel.

4.2 MAINTENANCE OF DAM

The maintenance of the dam is considered to be seriously inadequate. There are no formal procedures for evaluating the necessity for maintenance and the condition of the dam is not checked on a regular basis. It is recommended that formal maintenance procedures be developed and implemented.

4.3 MAINTENANCE OF OPERATING FACILITIES

The 10 inch drain and 12 inch outlet are the only operating facilities at the dam. The valves on these pipes have not been operated or had any maintenance performed for many years, and it is doubtful whether they are still operable. It is recommended that these valves be repaired, if necessary, and that formal preventive maintenance schedules be established to assure continued operation.

4.4 WARNING SYSTEM

At the present time, there is no formal warning system or evacuation plan in operation.

4.5 EVALUATION OF OPERATING ADEQUACY

Maintenance of the dam and operating facilities is considered to be seriously inadequate.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data - PennDER files were reviewed for hydrologic and hydraulic design data; however, no information on hydrology or hydraulic design was found.

b. Experience Data - There was no information available on the maximum reservoir level or discharge.

c. Visual Observations - The soil, vegetation, and other debris in the spillway reduces its capacity. The low area on the crest of the dam could have a minor effect on the hydraulic capability of the reservoir. The low spot at the end of the concrete wall on the right side of the dam will allow a large amount of water to escape from the reservoir and flow down the road during periods of high water levels.

d. Overtopping Potential - Gilkerson Dam is classified as a "High" hazard - "Small" size dam requiring evaluation for a spillway design flood (SDF) in the range of the 1/2 Probable Maximum Flood (1/2 PMF) to the Probable Maximum Flood (PMF). Since the dam is on the low end of the "Small" size category, the 1/2 PMF was chosen as the SDF. The hydraulic capabilities of the dam, reservoir, and spillway were obtained by routing the 1/2 PMF through the reservoir with the aid of the U.S. Army Corps of Engineers' Flood Hydrograph Package, HEC-1 DB. The hydrologic characteristics of the drainage basin, specifically the Snyder's unit hydrograph parameters, were obtained from a regionalized study conducted by the Baltimore District of the U.S. Army Corps of Engineers.

   The results of this analysis show that the spillway is capable of passing approximately 40 percent of the PMF without overtopping. During the 1/2 PMF, the dam is overtopped for 1.5 hours by a maximum depth of 0.21 foot.

e. Spillway Adequacy - The dam, as outlined in the above analysis, would be overtopped by the 1/2 PMF. The next criteria for determining spillway adequacy requires an estimate of whether the dam will fail during 1/2 PMF conditions. Therefore,

the following conditions were estimated as the limiting criteria which are likely to cause failure of the dam.

1) Depth of overtopping greater than or equal to 1.0 foot.

2) Duration of overtopping in excess of 2 hours.

The overtopping analysis of this dam yielded the following values:

1) Depth of overtopping equal to 0.21 foot.

2) Duration of overtopping equal to 1.5 hours.

Because of the small depth and short duration of overtopping and considering that the dam has a concrete core wall, it is estimated that dam failure is unlikely to occur during the 1/2 PMF; therefore, the spillway is classified as "inadequate" rather than "seriously inadequate", according to the recommended criteria.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations - A clear seep (estimated flow rate 10 g.p.m.) was found at the bottom of the junction between the right abutment and downstream embankment. Severe erosion has taken place along the upstream embankment and embankment crest. The deterioration of the concrete in the spillway does not indicate concern for the continued structural stability at this time.

b. Design and Construction Data - Calculations of structural stability were not available for review. Limited information concerning the dam foundation materials and conditions was contained in the PennDER files. It is estimated for this dam that further assessments of the stability are not necessary for this Phase I Inspection Report. However, if increased amounts of seepage or other signs of distress which would affect the structural stability of the embankment are observed during future inspections, a structural stability check should be performed.

c. Operating Records - Nothing in the operational information indicates concern relative to the structural stability of the dam.

d. Post-Construction Changes - No known changes adversely affecting the structural stability of the dam have been performed.

e. Seismic Stability - The dam is located in Seismic Zone 1 of the "Seismic Zone Map of the Contiguous United States," Figure 1, page D-30, "Recommended Guidelines for Safety Inspection of Dams." This is a zone of minor seismic activity. Therefore, further consideration of the seismic stability is not warranted.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS, REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety - Gilkerson Dam was found to be in very poor condition at the time of inspection. The dam is a "High" hazard -"Small" size dam requiring a spillway capacity in the range of the 1/2 PMF to PMF. The 1/2 PMF was chosen as the SDF because the dam is on the low end of the "Small" size category. As presented in Section 5, the spillway and reservoir are capable of passing 40 percent of the PMF without overtopping of the dam. During the 1/2 PMF, the depth and duration of overtopping are 0.21 foot and 1.5 hours, respectively. Because a limiting criteria of depth of overtopping of greater than or equal to 1.0 foot and duration in excess of 2 hours was estimated for this dam, it was concluded that a dam failure during the 1/2 PMF is unlikely to occur. Therefore, the spillway is considered to be "inadequate" but not "seriously inadequate".

   Extensive erosion has occurred along the upstream embankment and the dam crest. During the inspection, a clear seep (estimated flow rate 10 g.p.m.) was found at the bottom of the junction of the right abutment and downstream embankment.

b. Adequacy of Information - The information available and the observations made during the visual inspection are considered sufficient for this Phase I Inspection Report.

c. Urgency - The owner should initiate the actions discussed in paragraph 7.2 without delay, and immediately initiate the further investigation, as discussed in paragraph 7.1.d.

d. Necessity for Additional Data/Evaluation - The hydraulic/hydrologic analysis performed in connection with this Phase I Inspection Report has indicated the need for additional spillway capacity. It is recommended that the owner of Gilkerson Dam immediately initiate an engineering study to further evaluate the spillway capacity in order to develop recommendations for remedial measures to reduce the overtopping potential of the dam.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

The inspection and review of information revealed certain items of work which should be performed without delay by the owner. Items 1, 2, 3, and 6 below should be completed under the direction of a qualified professional engineer experienced in the design and construction of earth dams.

1) The owner should immediately initiate an engineering study to further evaluate the spillway capacity in order to develop recommendations for remedial measures to reduce the overtopping potential of the dam.

2) The valves on the 10 inch drain and/or 12 inch outlet should be restored to an operable condition. In the future, the operability of these valves should be checked at least once a year.

3) The embankment should be returned to a satisfactory condition through completion of the following items: the upstream embankment should be regraded and compacted; erosion protection should be provided; all brush and trees should be removed from the embankment; all holes in the embankment should be filled and compacted; the embankment should be seeded with grass and then cut as necessary.

4) The eroded and deteriorated concrete in the spillway should be repaired; the riprap in the lower portion of the discharge channel should be repaired.

5) All soil, vegetation, logs, and other debris should be removed from the spillway, approach channel, and discharge channel.

6) The seep at the bottom of the junction of the right abutment and downstream embankment should be monitored at regular intervals and during periods of high reservoir levels for turbidity and/or increase in flow, which may indicate potential for the piping of embankment material.

In addition, the following operational measures are recommended to be undertaken by the owner.

1) Develop a detailed emergency operation and warning system.

2) During periods of unusually heavy rain, provide around-the-clock surveillance of the dam.

3) When warning of a storm of major proportions is given by the National Weather Service, the owner should activate the emergency operation and warning system.

It is further recommended that formal inspection, maintenance, and operation procedures be developed and implemented.

APPENDIX A

VISUAL INSPECTION CHECK LIST, FIELD SKETCH, TOP OF DAM PROFILE, AND TYPICAL CROSS-SECTION

Check List
Visual Inspection
Phase 1

Name of Dam Gilkerson Dam County Westmoreland (Washington Township) State PA Coordinates Lat. N 40°34.2'

NDI # PA 01122
PennDER # 65-8

Long. W 79°34.7'

Date of Inspection 18 March 1980 Weather Cold, partly cloudy Temperature 40° F.

Pool Elevation at Time of Inspection 1023.6 ft.* M.S.L. Tailwater at Time of Inspection 1011.3 ft.* M.S.L.

*All elevations referenced to spillway crest, El. 1023.0 ft. M.S.L.

Inspection Personnel:

Michael Baker, Jr., Inc.:

Jeffrey A. Quay
Wayne D. Lasch
George Slagle

Owner's Representatives:

Milan Martinisko (owner)

Jeffrey A. Quay Recorder

CONCRETE/MASONRY DAMS - Not Applicable

Name of Dam: GILKERSON DAM
NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
LEAKAGE		
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS		
DRAINS		
WATER PASSAGES		
FOUNDATION		

CONCRETE/MASONRY DAMS - Not Applicable

Name of Dam: GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES		
STRUCTURAL CRACKING		
VERTICAL AND HORIZONTAL ALIGNMENT		
MONOLITH JOINTS		
CONSTRUCTION JOINTS		

EMBANKMENT

Name of Dam GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	No surface cracks were observed.	
RODENT HOLES	Two rodent holes were found: one near the center of the downstream embankment and one on the crest approximately 50 ft. to the right of the spillway.	The rodent holes should be filled.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	No movement or cracking was observed, but the entire area along and downstream of the toe was very wet.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	The surface of the downstream embankment was very irregular, but no obvious areas of sloughing or erosion were found. The crest and upstream embankment were very severely eroded. There were several areas where erosion had eaten all the way back into the crest; in some of these areas there was a vertical drop from the crest to the water.	Heavy vegetation made it immpossible to determine more exactly the extent of erosion on the downstream embankment. Trees on the crest appeared to be helping to retard erosion of the upstream embankment and crest.

EMBANKMENT

Name of Dam GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical alignment was fair. Top of dam elevations varied by only 0.7 ft. Erosion along the upstream side of the dam had taken place to such an extent that horizontal alignment of the crest was very poor.	
RIPRAP FAILURES	No riprap was found anywhere on the embankment. Riprap in the spillway approach channel was in fair condition. Riprap in the discharge channel was in very poor condition.	The design plans show that the entire upstream embankment was to be covered with 8 in. of broken stone, with a 4 ft. band of riprap near the waterline.
VEGETATION	The entire embankment was covered with a heavy growth of brambles, reeds, and small-to-medium size trees. Below this cover, most of the embankment surface was bare. There was very little grass cover on the embankment.	The brambles, reeds, and trees should be removed from the embankment. The embankment should then be reseeded.

EMBANKMENT

Name of Dam GILKERSON DAM
NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	The junction of the spillway and dam appeared to be in satisfactory condition. The right side of the embankment ended at an 18 in. wide concrete wall. The wall was approximately 5 ft. high at the centerline of the dam and extended upstream approximately 100 ft. The junctions of the abutments and embankment appeared to be in satisfactory condition, with no evidence of slumping or erosion (exception-see "ANY NOTICEABLE SEEPAGE.")	
ANY NOTICEABLE SEEPAGE	A clear seep (estimated flow rate 10 g.p.m.) was found at the bottom of the junction of the right abutment and the downstream embankment. The entire toe of the dam and a large area downstream of the right side of the embankment were very wet, with numerous pools of standing water.	An extensive growth of cattails and other marsh plants indicates that this area is usually very wet.
STAFF GAGE AND RECORDER	None	
DRAINS	None observed	The only drain shown on the design plans is a 6 in. terra cotta pipe under the riprapped portion of the spillway discharge channel.

OUTLET WORKS

Name of Dam: GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not Applicable. The design plans show two C.I.P. outlets, one 10 in. in diameter, the other 12 in. The only portions of these outlets that could be found during the inspection were the valve stems, located below the toe near the midpoint of the dam.	Neither of these outlets has been operated for a very long time. The intake structures are probably silted up, and the outlet may be buried, since the downstream ends of the pipes could not be found.
INTAKE STRUCTURE	Not observed	
OUTLET STRUCTURE	Not observed	
OUTLET CHANNEL	There was no discernable outlet channel.	
EMERGENCY GATE	Not observed	

UNGATED SPILLWAY

Name of Dam: GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	The control section of the spillway was a concrete weir formed by the continuation of the concrete core wall in the embankment. The spillway was located in the left abutment of the dam. At and just above the control section, the concrete in the left side of the spillway and in the training walls was badly deteriorated and eroded. The left quarter of the spillway was filled with soil out of which bushes and small trees were growing.	The soil and growth in the spillway should be removed; the deteriorated concrete should be removed and replaced.
APPROACH CHANNEL	The left half of the riprapped approach channel was filled with soil out of which bushes and small-to-medium size trees were growing. The rest of the approach channel was almost completely blocked with a large number of floating logs.	The owner said that children play in the reservoir and make rafts every summer; that is the origin of the logs. The approach channel should be cleared; all soil, vegetation, and debris should be removed.
DISCHARGE CHANNEL	Water flowing over the control section dropped approximately 2 ft. into a curving concrete chute 30 ft. long, then flowed into a riprapped trapezoidal channel. The discharge channel was partially filled and partially blocked with small logs and other debris. The riprap in the lower portion of the channel was badly deteriorated.	The discharge channel should be cleaned up; all soil and debris should be removed. The riprap in the lower portion of the channel should be repaired.
BRIDGE AND PIERS	Not Applicable	

GATED SPILLWAY - Not Applicable

Name of Dam: GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL		
APPROACH CHANNEL		
DISCHARGE CHANNEL		
BRIDGE AND PIERS		
GATES AND OPERATION EQUIPMENT		

INSTRUMENTATION

Name of Dam: GILKERSON DAM
NDI # PA 01122

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	No permanent monuments were found.	
OBSERVATION WELLS	None observed	
WEIRS	None	
PIEZOMETERS	None observed	
OTHER		

RESERVOIR

Name of Dam: GILKERSON DAM

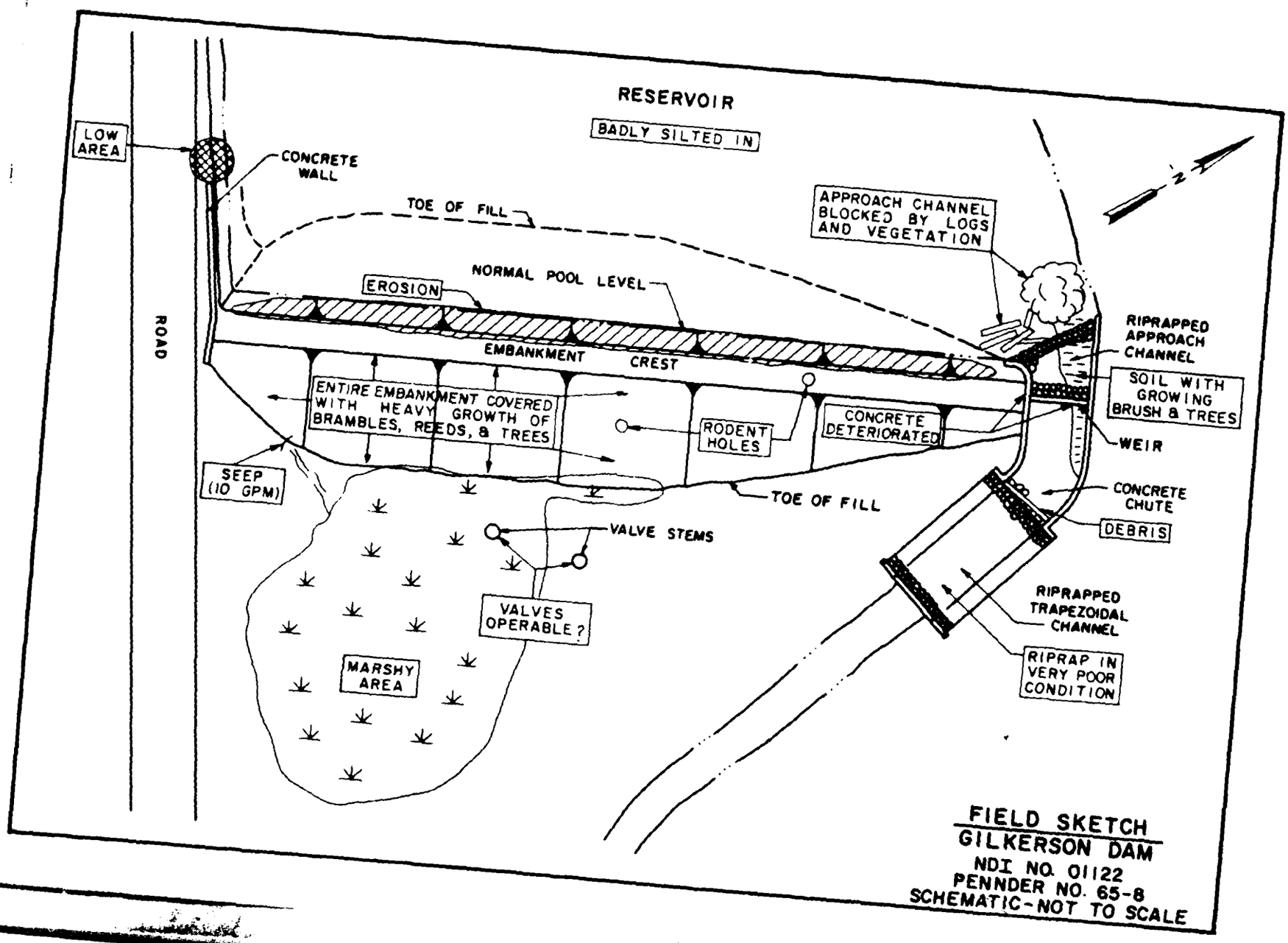
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	A public road ran along the right side of the reservoir approximately 2 to 3 ft. above normal water level. There was a concrete wall between the road and reservoir, extending upstream approximately 100 ft. from the centerline of the embankment. There were several houses on the other side of the road. The left side of the reservoir was wooded and moderately sloped.	At high water levels, a large amount of water will flow around the upstream end of the concrete wall and down the road.
SEDIMENTATION	The extent of sedimentation was not observed during the inspection.	According to the owner, the reservoir was almost completely silted in. He said that the deepest part he was able to find was only 5 to 6 ft. deep, and that much of the reservoir was only 2 to 3 ft. deep.

DOWNSTREAM CHANNEL

Name of Dam: GILKERSON DAM

NDI # PA 01122

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	State Route 66 crossed the downstream channel on a 10 ft. high embankment approximately 400 ft. downstream of the dam. The culvert under the road consisted of a 4 by 4 ft. box culvert. There were some bushes growing along the channel, but the channel itself was clear of obstructions.	A large discharge from the reservoir will probably cause water to back up behind the road embankment and flow over the road.
SLOPES	Below the dam, the stream has a slope of approximately 2.5%. The side slopes are covered with brush, weeds, and a few trees.	
APPROXIMATE NO. OF HOMES AND POPULATION	There were two houses slightly lower than the dam within a few hundred ft. downstream.	

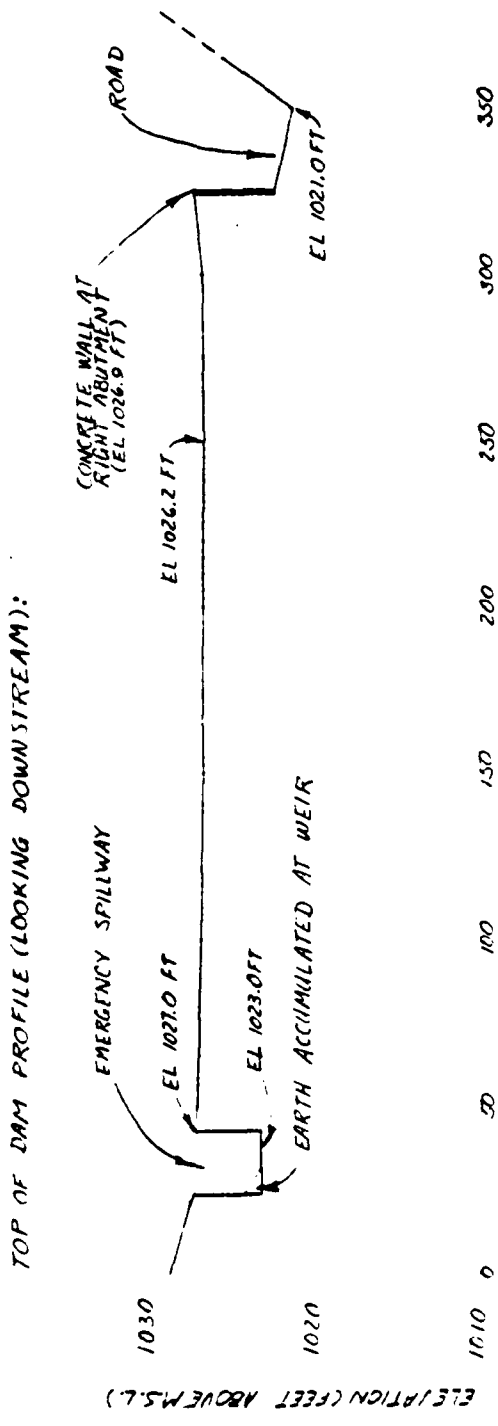


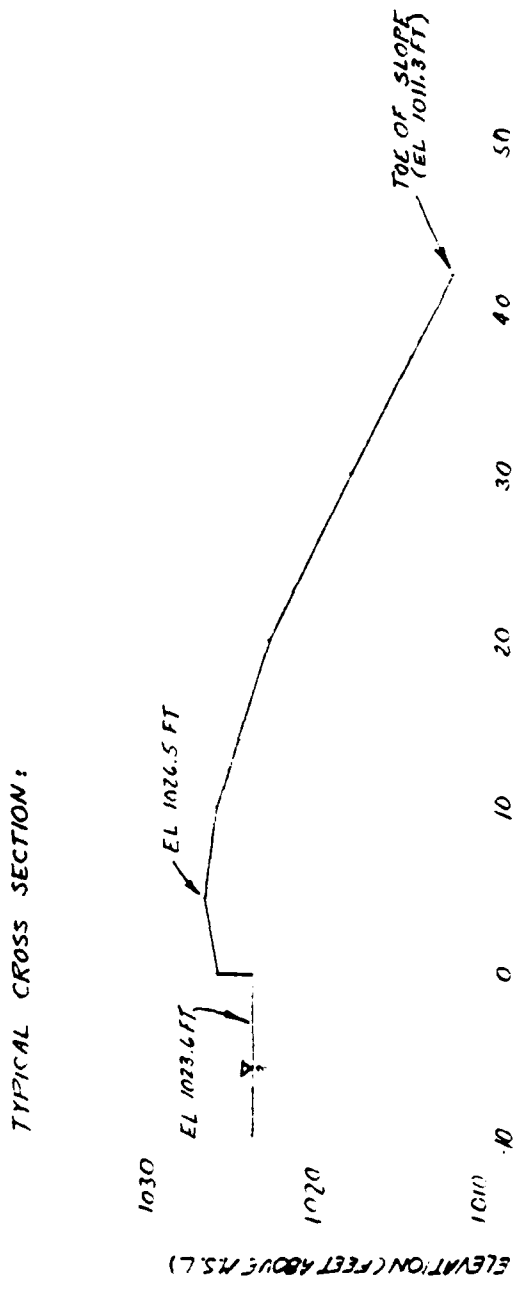
FIELD SKETCH
GILKERSON DAM
NDI NO. 01122
PENNDER NO. 65-8
SCHEMATIC - NOT TO SCALE

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS
8 April 1980
Box 280
Beaver, Pa. 15009

TOP OF DAM PROFILE
TYPICAL CROSS-SECTION

Date of Inspection - 18 March 1980





APPENDIX B

ENGINEERING DATA CHECK LIST

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Name of Dam: GILKERSON DAM
NDI # PA 01122

ITEM	REMARKS
PLAN OF DAM	The original design drawing showing the plan of dam has been reproduced and included in this report as Plate 3.
REGIONAL VICINITY MAP	A USGS 7.5 minute topographic quadrangle, Vandergrift, Pennsylvania, was used to prepare the vicinity map which is enclosed in this report as the Location Plan (Plate 1).
CONSTRUCTION HISTORY	The dam was designed and its construction supervised by W.C. Hawley of the Apollo Waterworks Company. Construction began in June 1913 and was completed by June 1914.
TYPICAL SECTIONS OF DAM	An original design drawing cross section is shown on Plate 3 of this report. A typical cross-section, surveyed during the visual inspection, is included in Appendix A.
HYDROLOGIC/HYDRAULIC DATA	No information available
OUTLETS - PLAN and DETAILS	See Plate 3 of this report.
- CONSTRAINTS	None
- DISCHARGE RATINGS	No information available
RAINFALL/RESERVOIR RECORDS	No information available

Name of Dam: GILKERSON DAM

NDI # PA 01122

ITEM	REMARKS
DESIGN REPORTS	None available. The only design information available is contained in a "Report on the Application of the Apollo Waterways Company for Permission to Construct a Dam ...". This report is part of the PennDER file for Gilkerson Dam.
GEOLOGY REPORTS	No information was available. The regional geology is included in this report as Appendix F.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	A series of test pits and bore holes were made in the area of the dam and reservoir, but no detailed analyses were made of the samples obtained.
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	The material for the embankment apparently consisted of clay obtained from the reservoir area.

Name of Dam: GILKERSON DAM

NDI # PA 01122

ITEM	REMARKS
MONITORING SYSTEMS	None
MODIFICATIONS	No information available
HIGH POOL RECORDS	No information available
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Numerous inspection reports by members of various state agencies are contained in the PennDER file for Gilkerson Dam.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None
MAINTENANCE OPERATION RECORDS	None

Name of Dam: GILKERSON DAM

NDI # PA 01122

ITEM	REMARKS
SPILLWAY PLAN, SECTIONS, and DETAILS	See Plate 3 of this report.
OPERATING EQUIPMENT PLANS & DETAILS	See Plate 3 of this report.

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: .34 sq.mi. (suburban residential, farmland, woods)

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1023.0 ft. M.S.L. (22 ac.-ft.)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1026.2 ft. M.S.L. (36 ac.-ft.)

ELEVATION MAXIMUM DESIGN POOL: Unknown

ELEVATION TOP DAM: 1027.0 ft. M.S.L. (design); 1026.2 ft. M.S.L. (min.)

SPILLWAY:

a. Crest Elevation 1023.0 ft. M.S.L.
b. Type Concrete sill with 2 ft. drop on downstream side
c. Width of Crest Parallel to Flow 2 ft.
d. Length of Crest Perpendicular to Flow 20 ft. (design); 19.4 ft. (measured during field inspection)
e. Location Spillover Left abutment
f. Number and Type of Gates None

OUTLET WORKS: Drain and Outlet

a. Type 10 in. drain and 12 in. outlet-C.I.P.s embeded in concrete cradles
b. Location Through embankment near center of dam
c. Entrance Inverts 1008.0 ft. (drain); 1011.0 ft. (outlet)
d. Exit Inverts 1005.0 ft. (drain); 1003.5 ft. (outlet)
e. Emergency Drawdown Facilities Drain and outlet, if operable, could both be used for drawdown

HYDROMETEOROLOGICAL GAGES: None

a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE Unknown

APPENDIX C

PHOTOGRAPH LOCATION PLAN AND PHOTOGRAPHS

DETAILED PHOTOGRAPH DESCRIPTIONS

Overall View of Dam
- Top Photo (OV-T) - Overall View of Dam from Upstream
- Bottom Photo (OV-B) - Overall View of Dam from Downstream

Photograph Location Plan

Photo 1 - Erosion on Upstream Face of Embankment

Photo 2 - Looking Upstream at Spillway

Photo 3 - Looking Upstream at Logs in Spillway Approach Channel

Photo 4 - Looking Downstream at Debris in Spillway Discharge Channel

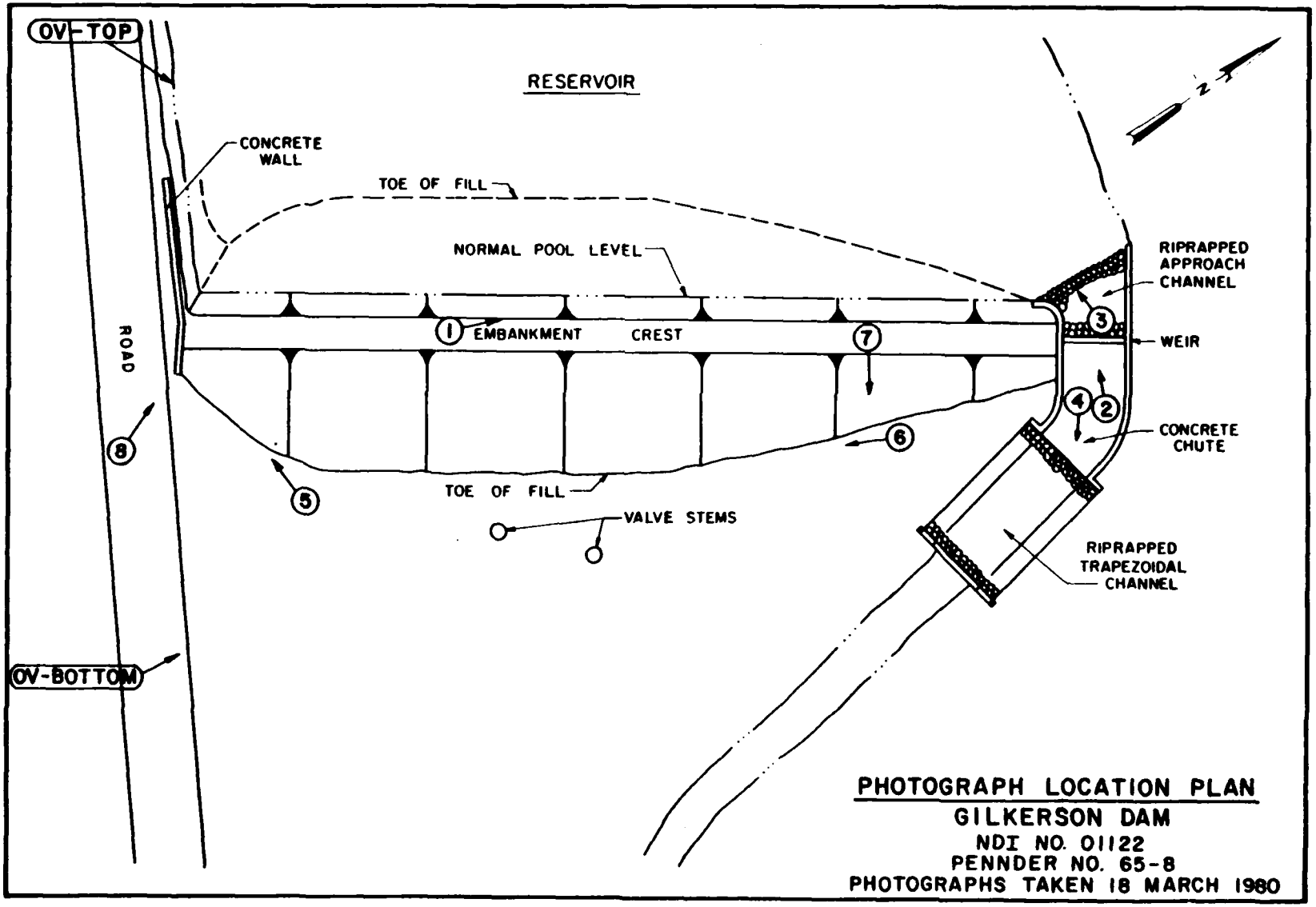
Photo 5 - Seep at Bottom of Junction of Right Abutment and Downstream Embankment

Photo 6 - View Across Downstream Embankment

Photo 7 - Downstream Area from Dam Crest

Photo 8 - Concrete Wall along Right Side of Dam Reservoir

Note: Photographs were taken on 18 March 1980.



PHOTOGRAPH LOCATION PLAN

GILKERSON DAM

NDI NO. 01122

PENNDER NO. 65-8

PHOTOGRAPHS TAKEN 18 MARCH 1980

PHOTO 1. Erosion on Upstream Face of Embankment

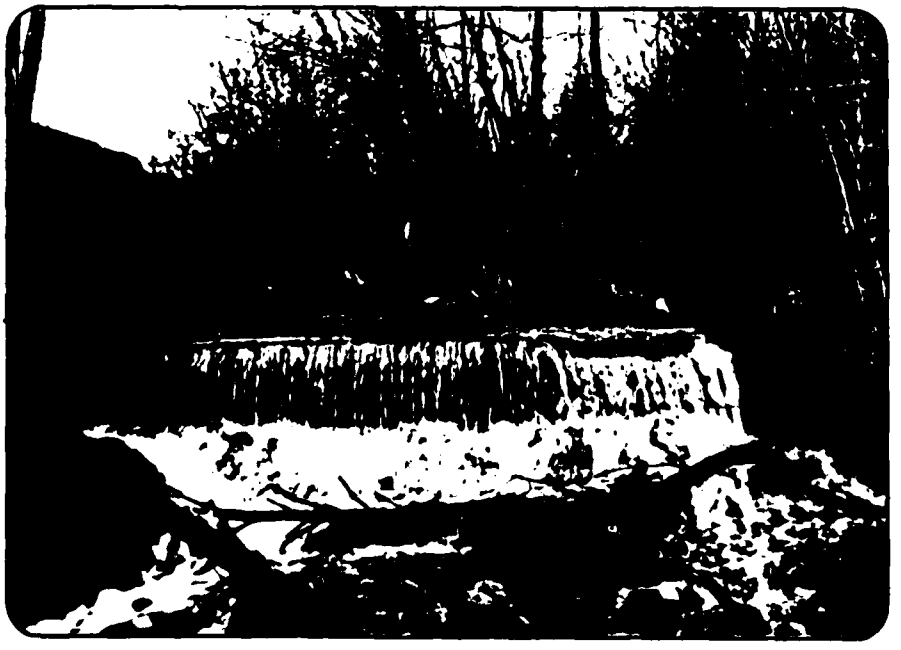


PHOTO 2. Looking Upstream at Spillway

PHOTO 3. Looking Upstream at Logs in Spillway Approach Channel

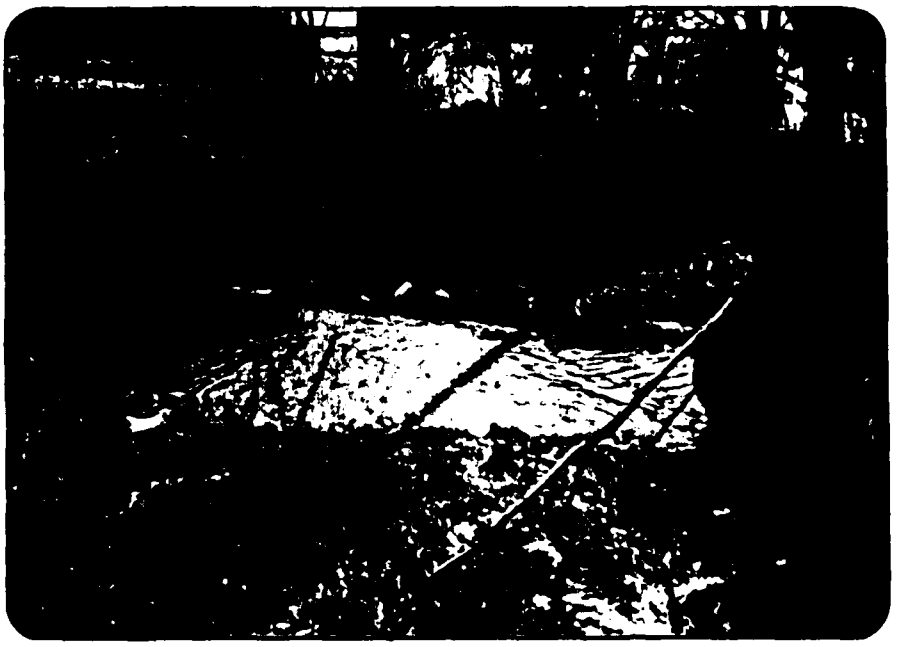


PHOTO 4. Looking Downstream at Debris in Spillway Discharge Channel

PHOTO 5. Seep at Bottom of Junction of Right Abutment and Downstream Embankment

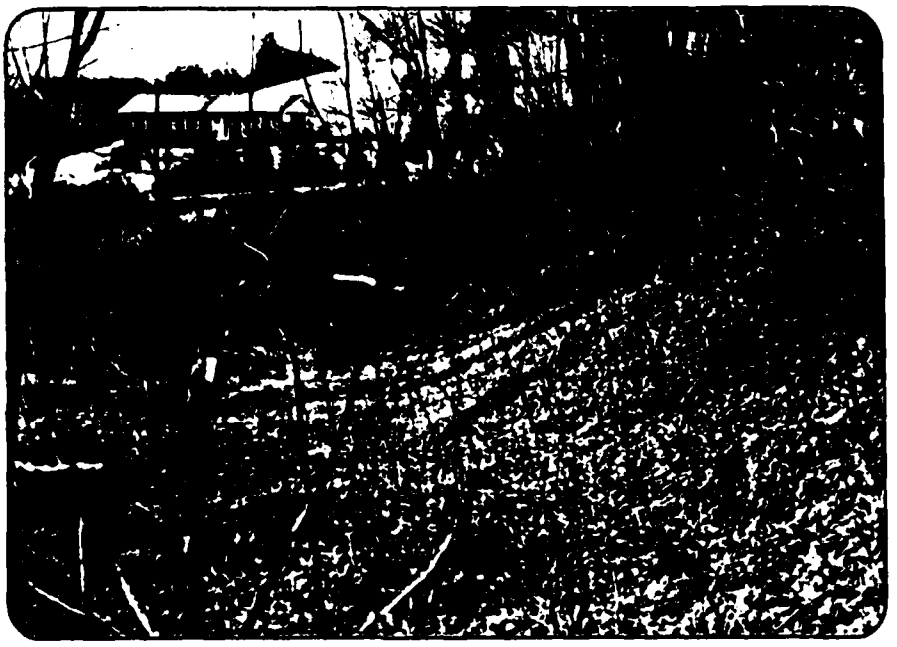


PHOTO 6. View Across Downstream Embankment

PHOTO 7. Downstream Area from Dam Crest

PHOTO 8. Concrete Wall along Right Side of Dam Reservoir

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject GILKERSON RUN-MIDDLE CREEK S.O. No. _____
AND ALTERNATIVES STUDY Sheet No. _____ of _____
Drawing No. _____
Computed by _____ Checked by _____ Date _____

Table of Contents

PREFACE

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

The hydrologic determinations presented in this Phase I Inspection Report are based on the use of a Snyder's unit hydrograph developed by the U.S. Army Corps of Engineers. Due to the limited number of gaging stations available in this hydrologic region and the wide variations of watershed slopes, the Snyder's coefficients may yield results of limited accuracy for this watershed. As directed however, a further refinement of these coefficients is beyond the scope of this Phase I Investigation.

In addition, the conclusions presented pertain to present conditions, and the effect of future development on the hydrology has not been considered.

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASL

NAME OF DAM: GILKERSON DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.8 INCHES/24 HOURS[1]

STATION	1	2	3	4	5
Station Description	GILKERSON DAM				
Drainage Area (square miles)	0.34				
Cumulative Drainage Area (square miles)	0.34				
Adjustment of PMF for Drainage Area (%)[2]	Zone 7				
6 Hours	102				
12 Hours	120				
24 Hours	130				
48 Hours	140				
72 Hours	--				
Snyder Hydrograph Parameters					
Zone [3]	24				
C_p/C_t [4]	0.45/1.6				
L (miles) [5]	0.82				
L_{ca} (miles)[5]	0.34				
$t_p = C_t (L \cdot L_{ca})^{0.3}$ (hours)	1.09				
Spillway Data					
Crest Length (ft)	19.4				
Freeboard (ft)	2				
Discharge Coefficient	3.09				
Exponent	1.5				

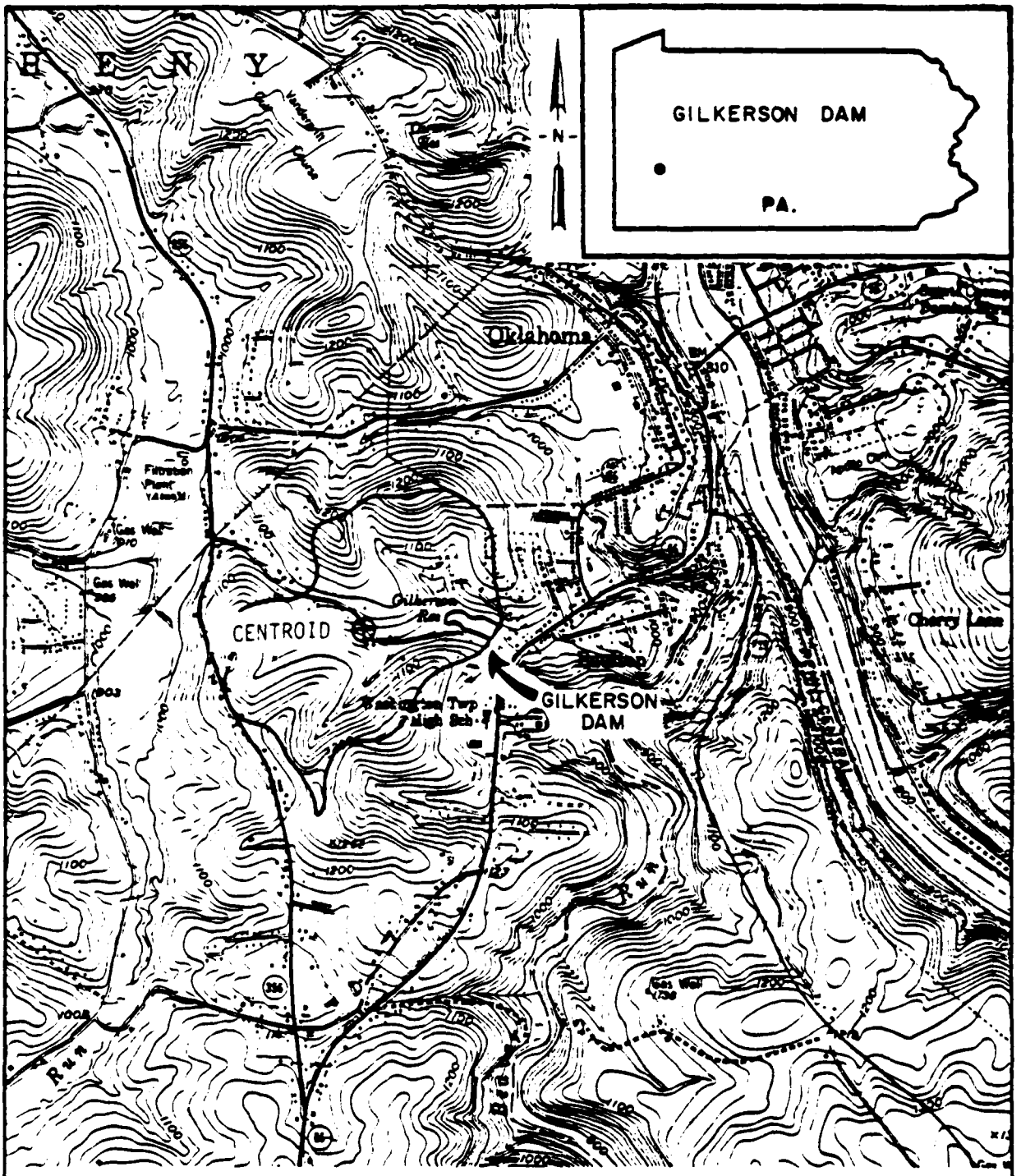
(1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

(2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

(3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

(4) Snyder's Coefficients.

(5) L = Length of longest water course from outlet to basin divide.
L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.



GILKERSON DAM
DRAINAGE AREA MAP

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject GILKERSON DAM S.O. No. 1547-00-APA-17
Sheet No. 3 of 11
Drawing No.
Computed by WLS Checked by JAQ Date 13 MARCH 80

DRAINAGE AREA ABOVE DAM = 2.37 SQ. IN. = 0.34 SQ. MI.
(MEASURED ON VANDERGRIF, PA, 7.5 MINUTE QUAD)

SNYDERS UNIT HYDROGRAPH PARAMETERS —

$L = 0.82$ MI.
$L_{CA} = 0.34$ MI

WATERSHED IN ZONE NUMBER 24
$C_p = 0.45$
$C_T = 1.6$ (PLATE M)
$T_p = C_T (L \times L_{CA})^{.3} = 0.45 (.82 \times .34)^{.3} = 1.09$
($t_p/5.5 = .20$, time interval = .25, close enough)

PRECIPITATION VALUES FROM HMR 33 -

PROBABLE MAXIMUM PRECIPITATION = 23.8 IN.
(200 SQ·MILE, 24 HOUR, ALL-SEASON ENVELOPE)

WATERSHED IS IN ZONE 7 ON FIGURE 1

6 HR, 10 SQ. MI. PMP = 102% = 24.3 IN
12 HR, 10 SQ. MI PMP = 120% = 28.6 IN
24 HR, 10 SQ. MI PMP = 130% = 30.9 IN
48 HR, 10 SQ MI PMP = 140% = 33.3 IN

SURFACE AREA - ELEVATION DATA -
(PLANIMETERED FROM PLAN OF RESERVOIR IN PENNDER FILE)

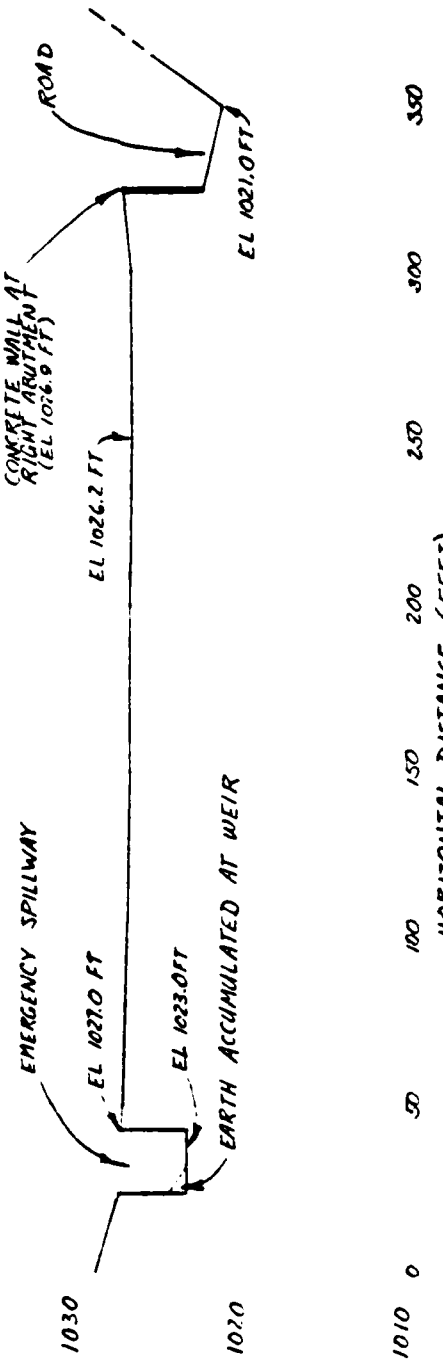
1010 - 0.3 ACRES
1012 - 0.6 ACRES
1014 - 1.1 ACRES
1016 - 1.5 ACRES
1018 - 2.1 ACRES
1020 - 2.6 ACRES
1022 - 3.3 ACRES
1024 - 4.2 ACRES
1026 - 4.9 ACRES
1028 - 5.8 ACRES

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

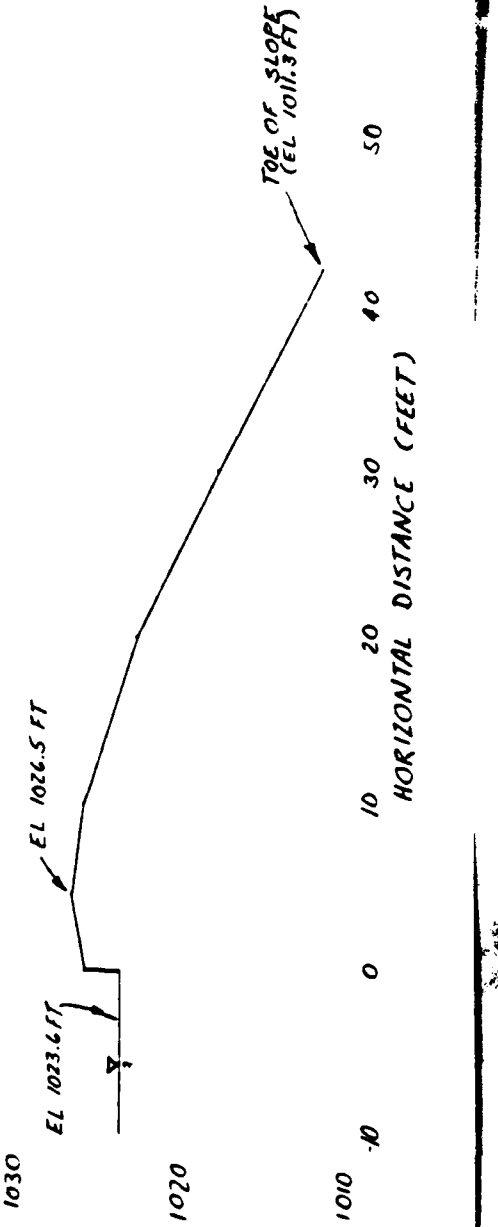
Box 280
Beaver, Pa. 15009

Subject GILKERSON DAM — S.O. No. 13547-00-ARA-17
TOP OF DAM PROFILE — Sheet No. 4 of 11
TYPICAL CROSS SECTION — Drawing No.
Computed by JAQ — Checked by WDL — Date 4/8/80

TOP OF DAM PROFILE (LOOKING DOWNSTREAM):



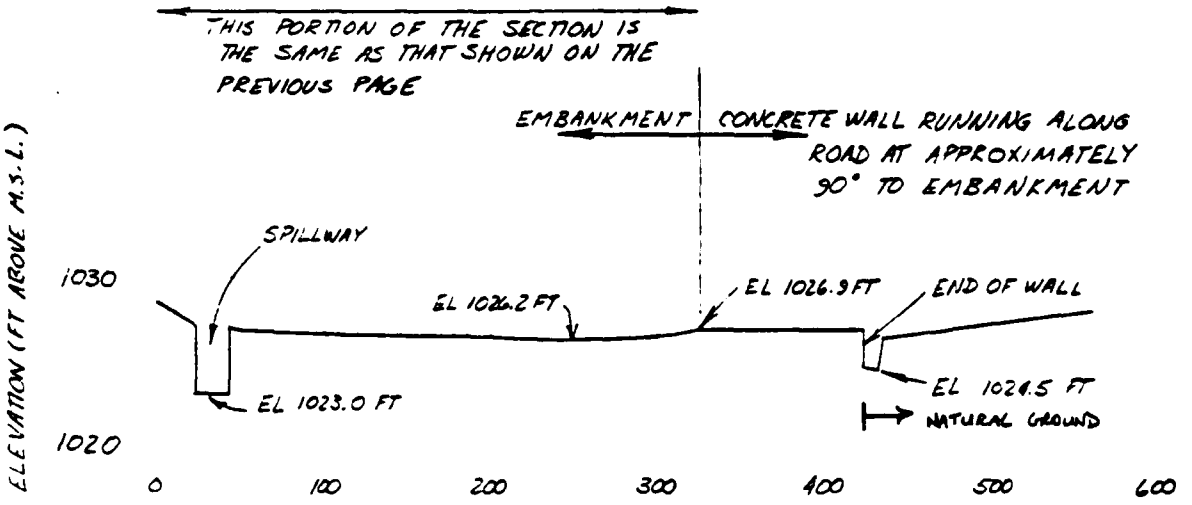
TYPICAL CROSS SECTION:



MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject GILVERSON DAM S.O. No. 13547-00-ARA-17
TOP OF DAM PROFILE USED Sheet No. 5 of 11
IN COMPUTER ANALYSIS Drawing No. ____
Computed by JAQ Checked by WDL Date 4/8/80



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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  (1) UPDATE         04 JUN 79
**********************************
    1                 AI      NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
    2                 A2      HYDROLOGIC AND HYDRAULIC ANALYSIS OF GILKERSON DAM
    3                 A3      PMF, 3/4 PMF, 1/2 PMF, 1/4 PMF
    4                 B    400       0      15       0       0       0       0       0      -4       0
    5                 B1     5
    6                 J      1       4       1
    7                 J1   1.0     .75     .50     .25
    8                 K      0       1                                               1
    9                 K1      HYDROGRAPH DEVELOPMENT
   10                 M      1       1    0.34               0.34                                1
   11                 P             23.8     102     120     130     140
   12                 T                                                       1.0     .05
   13                 W   1.09    0.45
   14                 X   -1.5    -.05       2                                            -1
   15                 K      1       2                                               1
   16                 K1      FLOOD ROUTING THROUGH GILKERSON DAM
   17                 Y                                      1       1
   18                 Y1     1                                                -1023.
   19                 $A     0      .6     1.1     1.5     2.1     2.6     3.3     4.2     4.9     5.8
   20                 $E  1013    1012    1014    1016    1018    1020    1022    1024    1026    1028
   21                 $$1023.0    19.4    3.09     1.5
   22                 $U1024.5     2.8     1.5
   23                 $L     0     8.6     8.7   208.7   380.0   540.0   600.
   24                 $V1024.5 1024.74 1026.21 1026.63 1026.92 1028.44 1029.0
   25                 K     99
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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MOD UPDATE         04 JUN 79
**********

RUN  DATE 04/01/80
     TIME    14.10
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NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
HYDROLOGIC AND HYDRAULIC ANALYSIS OF GILKERSON DAM
PMF, 3/4 PMF, 1/2 PMF, 1/4 PMF

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
400	0	15	0	0	0	0	0	-4	0

JOPER	NRT	LRUPT	IRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1
RTIOS= 1.00 0.75 0.50 0.25

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

HYDROGRAPH DEVELOPMENT

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISHOW	ISAME	LOCAL
1	1	0.34	0.0	0.34	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	23.40	102.00	120.00	130.00	140.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LRUPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOR	STRIL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.05	0.0	0.0

UNIT HYDROGRAPH DATA
TP= 1.09 CP=0.65 NTA= 0

RECESSION DATA
STRTQ= -1.50 QRCSN= -0.05 RTIOR= 2.00

UNIT HYDROGRAPH 40 END-OF-PERIOD ORDINATES, LAG= 1.09 HOURS, CP= 0.65 VOL= 1.00

8.	31.	60.	83.	89.	81.	70.	61.	53.	46.
40.	34.	30.	26.	22.	19.	17.	14.	13.	11.
9.	8.	7.	6.	5.	5.	4.	3.	3.	3.
2.	2.	2.	1.	1.	1.	1.	1.	1.	1.

END-OF-PERIOD FLOW

MO. DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	20.00	29.24	2.42	21347.
										877.31	816.31	81.31	810.141

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

FLOOD ROUTING THROUGH GILKERSON DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	2	0	1	0	0

ROUTING DATA

JLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.0	0.0	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ESPRAT
1	0	0	0.0	0.0	0.0	-1023.	0

SURFACE AREA=	0.	1.	1.	2.	2.	3.	3.	4.	5.	6.
CAPACITY=	0.	0.	2.	5.	8.	13.	19.	26.	35.	46.
ELEVATION=	1010.	1012.	1014.	1016.	1018.	1020.	1022.	1024.	1026.	1028.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CARLA	EXPL
1023.0	19.4	3.1	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1024.5	2.8	1.5	0.

CREST LENGTH	0.	9.	9.	209.	380.	540.	600.	
AT OR BELOW ELEVATION	1024.5	1024.7	1026.2	1026.6	1026.9	1028.4	1029.0	

PEAK OUTFLOW IS 932. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 697. AT TIME 40.75 HOURS

PEAK OUTFLOW IS 454. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 221. AT TIME 41.25 HOURS

********** ********** ********** ********** **********

PAGE 8

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	RATIO 2 0.75	RATIO 3 0.50	RATIO 4 0.25
HYDROGRAPH AT	1	0.34	1	933.	700.	467.	233.
		(0.88)	(	26.42)(	19.82)(	13.21)(	6.61)(
ROUTED TO	2	0.34	1	932.	697.	464.	221.
		(0.88)	(	26.39)(	19.73)(	12.86)(	6.25)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1023.00	1023.00	1024.50
STORAGE	22.	22.	28.
OUTFLOW	0.	0.	110.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1027.02	2.52	41.	932.	10.25	40.75	0.0
0.75	1026.82	2.32	40.	697.	9.00	40.75	0.0
0.50	1026.42	1.92	37.	454.	7.25	41.00	0.0
0.25	1025.28	0.78	32.	221.	4.25	41.25	0.0

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

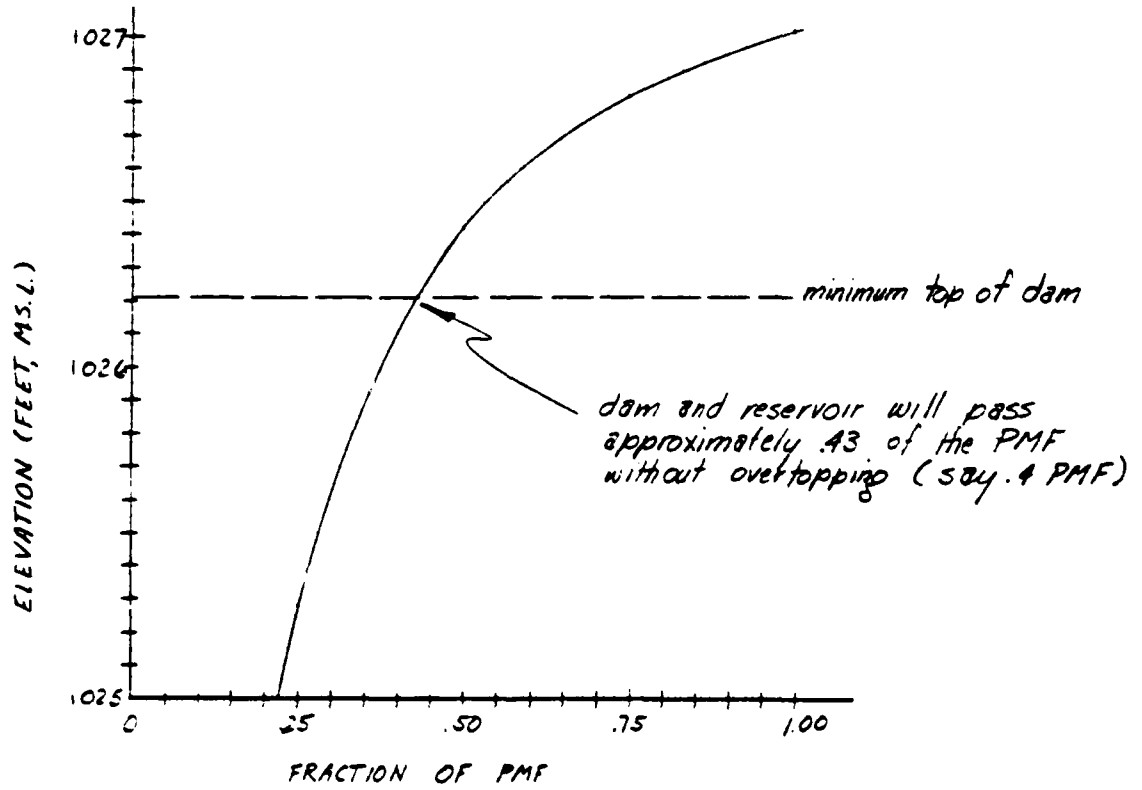
Subject GILKERSON DAM — CAPACITY OF DAM AND RESERVOIR

S.O. No. 13547-00-ARA-17

Sheet No. 11 of 11

Drawing No.

Computed by JAG Checked by WDL Date 4/7/80



APPENDIX E

PLATES

CONTENTS

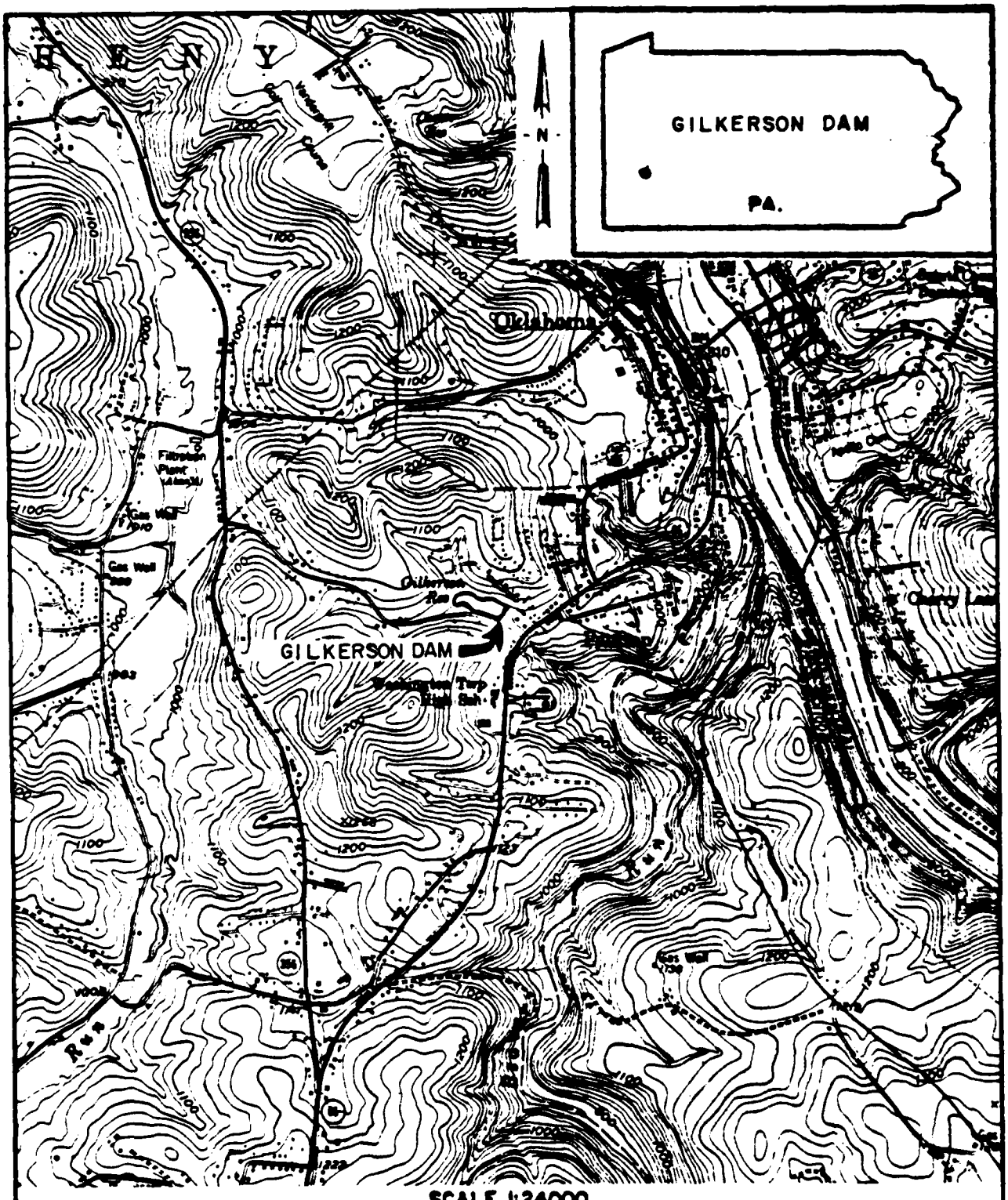
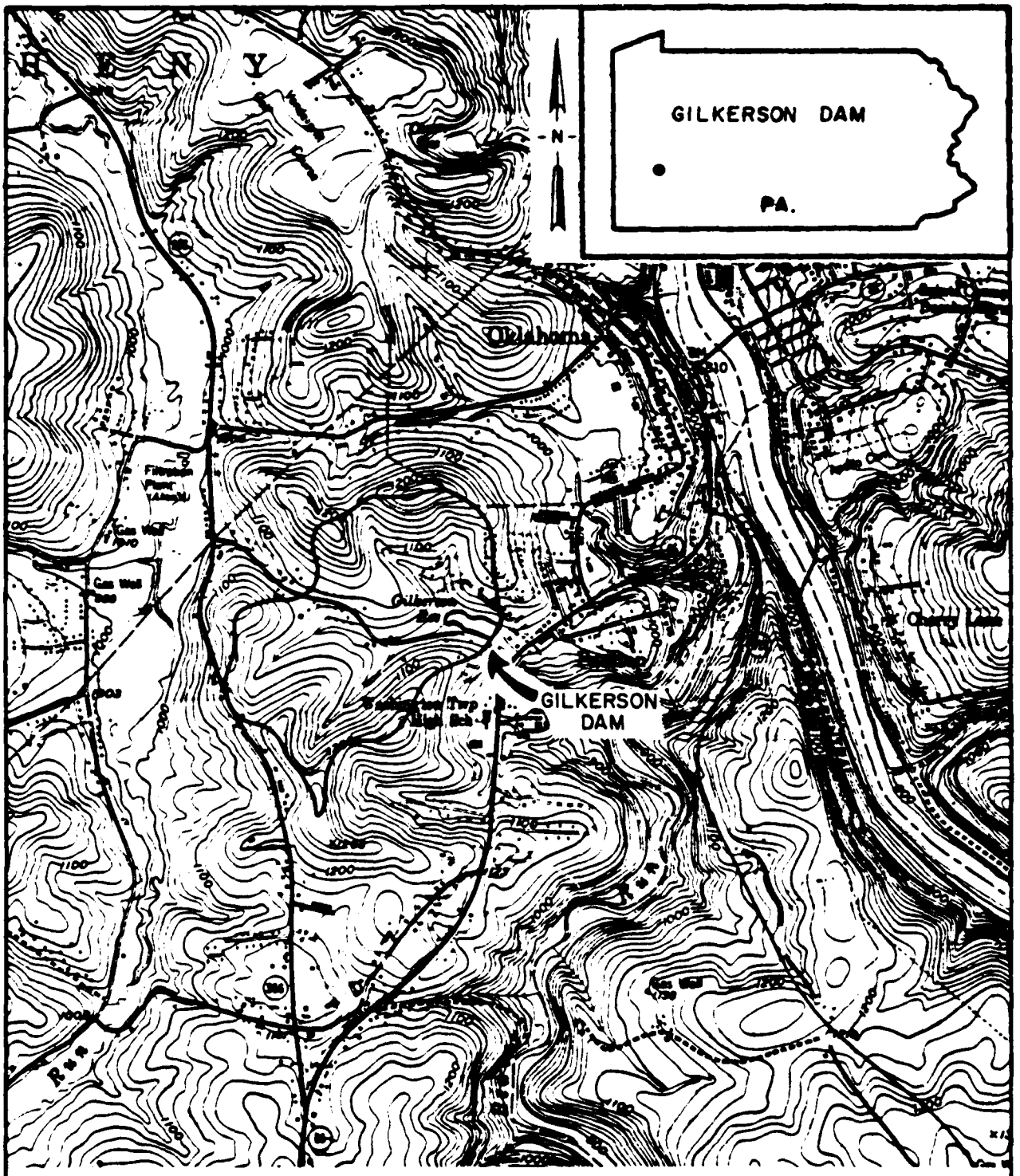


PLATE 1 LOCATION PLAN
GILKERSON DAM



SCALE 1:24000

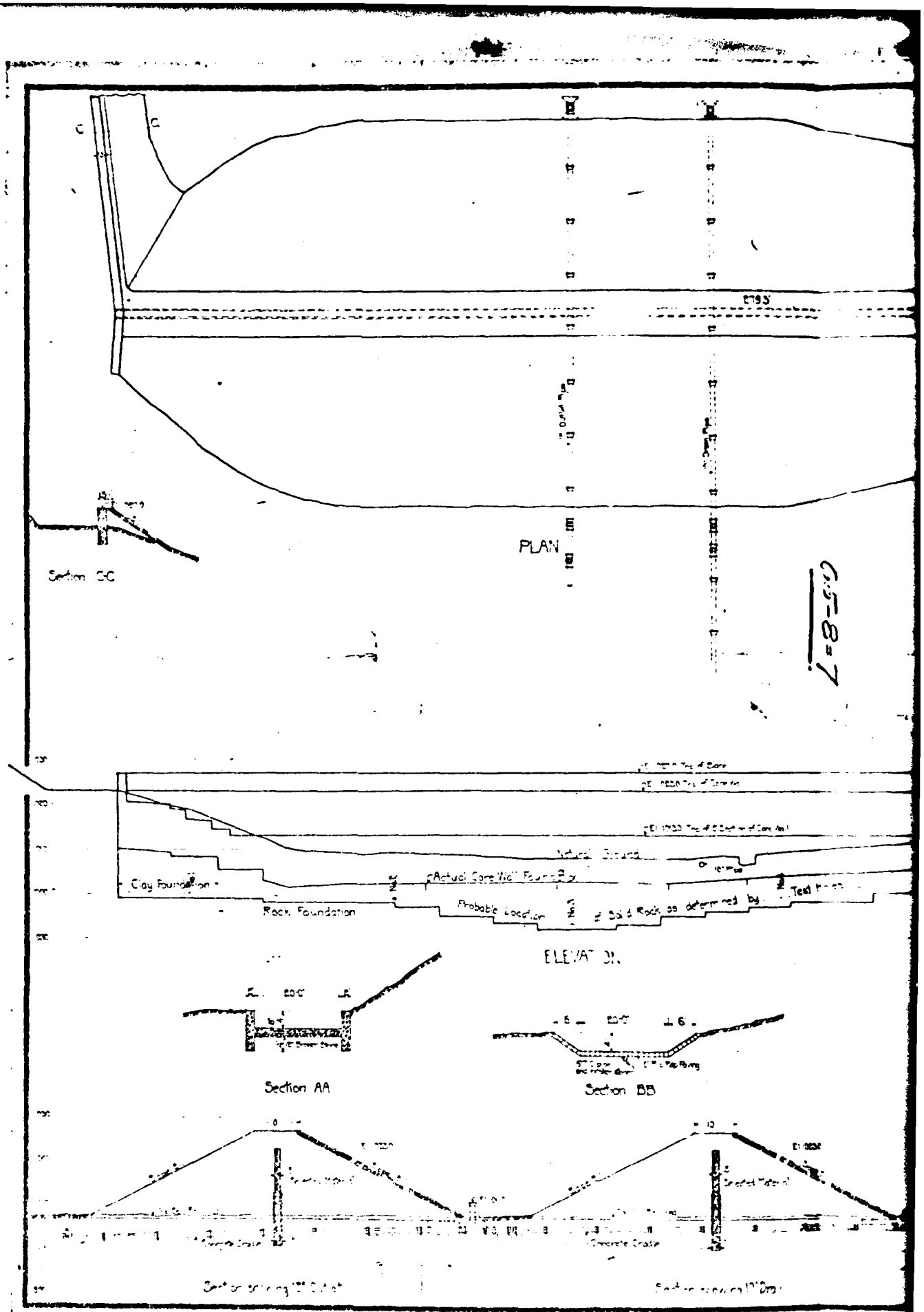
1 1/2 0 1 MILE

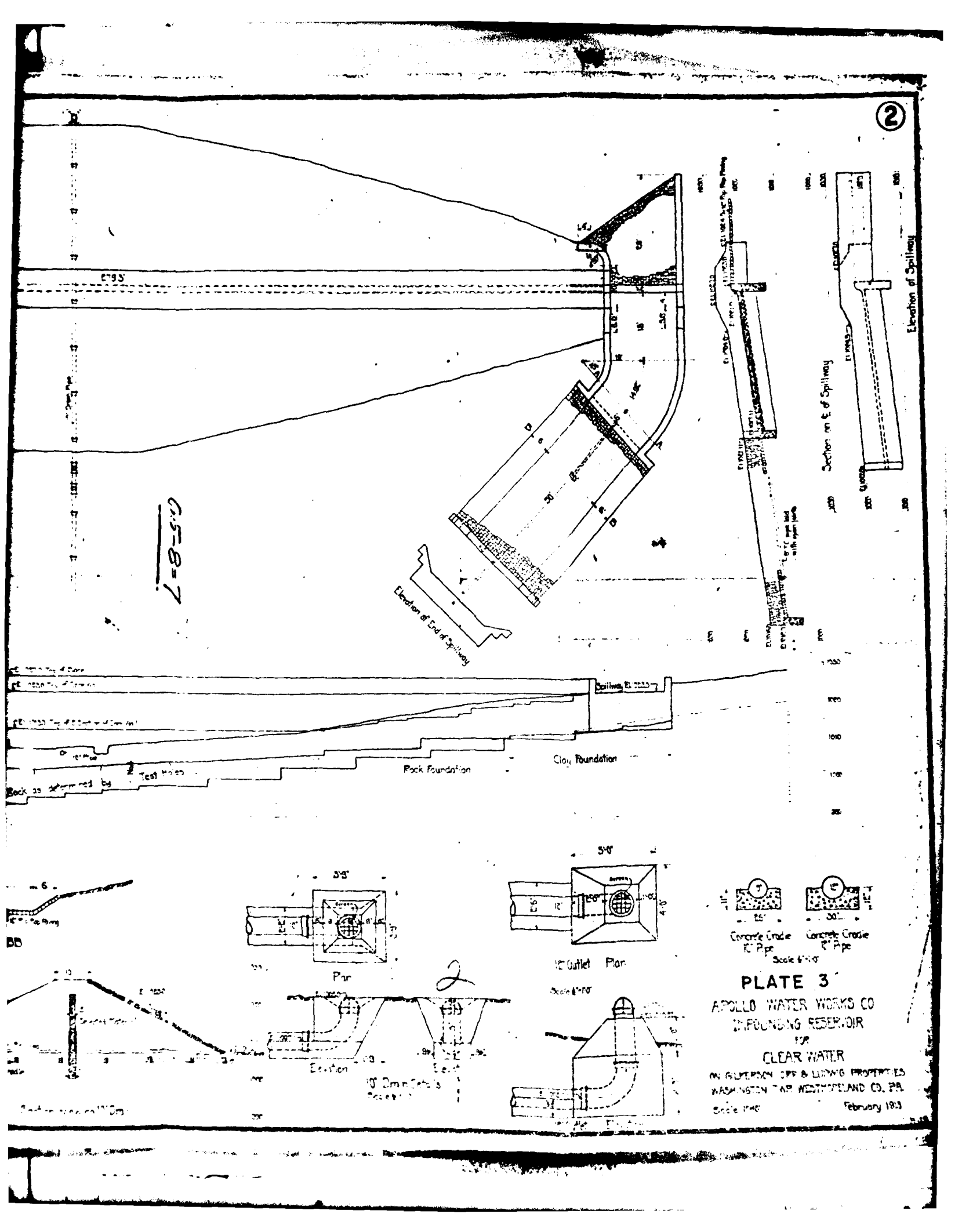
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

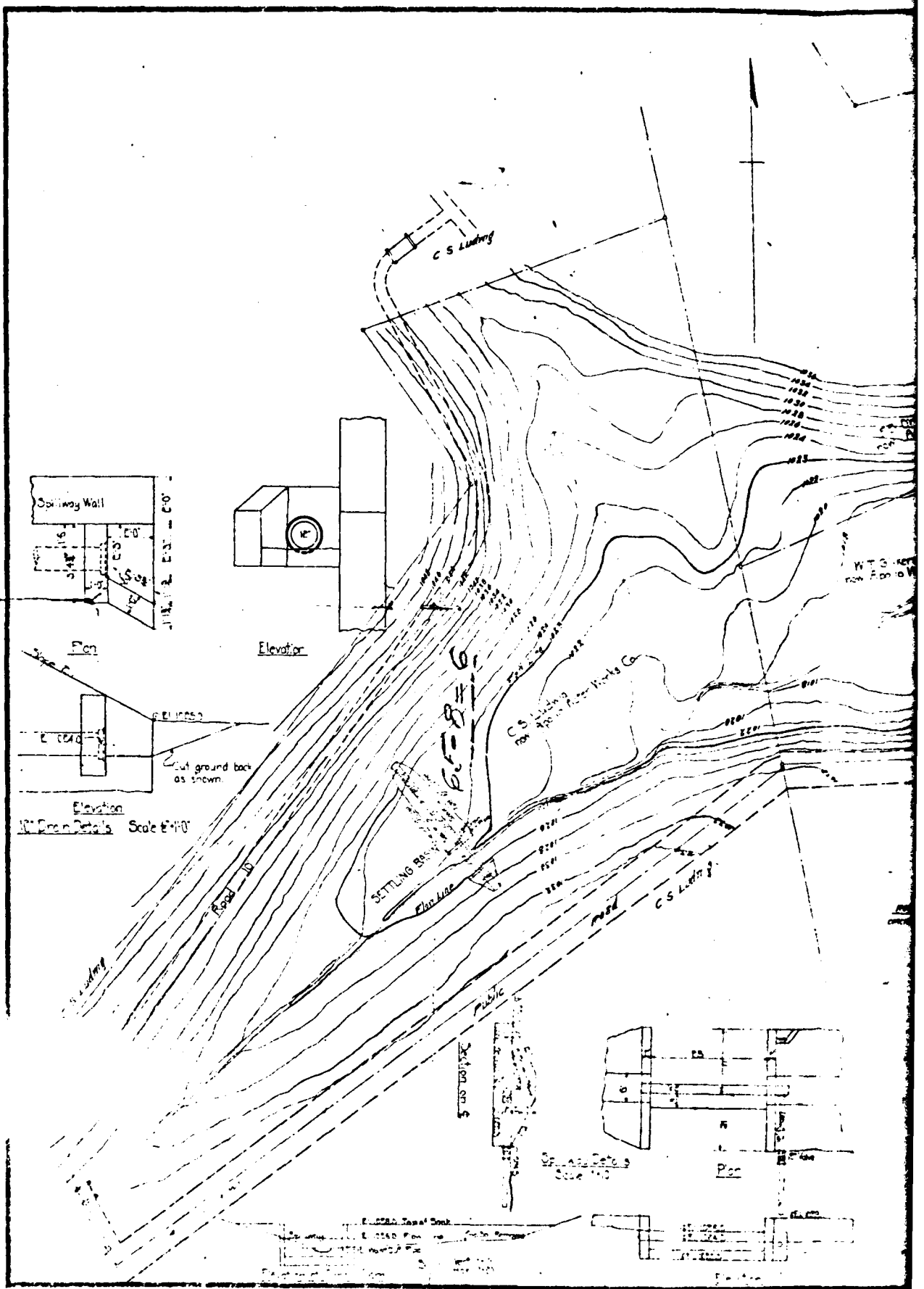
1 0 1 KILOMETER

PLATE 2 WATERSHED MAP

GILKERSON DAM


C
C
PLAN
Section CC
Clay Foundation
Rock Foundation
Probable Location
ELEVATION
Section AA
Section BB
Concrete Cradle
Concrete Cradle


Elevation of End of Spillway
Section on E of Spillway
Elevation of Spillway
Test Holes
Rock Foundation
Clay Foundation
Plan
Concrete Cradle 12" Pipe
Concrete Cradle 8" Pipe
Scale 1"=10'
PLATE 3
APOLLO WATER WORKS CO
IMPOUNDING RESERVOIR
FOR
CLEAR WATER
IN GLUYERSON OFF & LUDWIG PROPERTIES
WASHINGTON TWP WESTMORELAND CO. PA.
February 1913


Spillway Wall
Plan
Elevation
Elevation
Scale 1"=10'
C S Ludwig
SETTLING BASIN
Road
Public
Plan

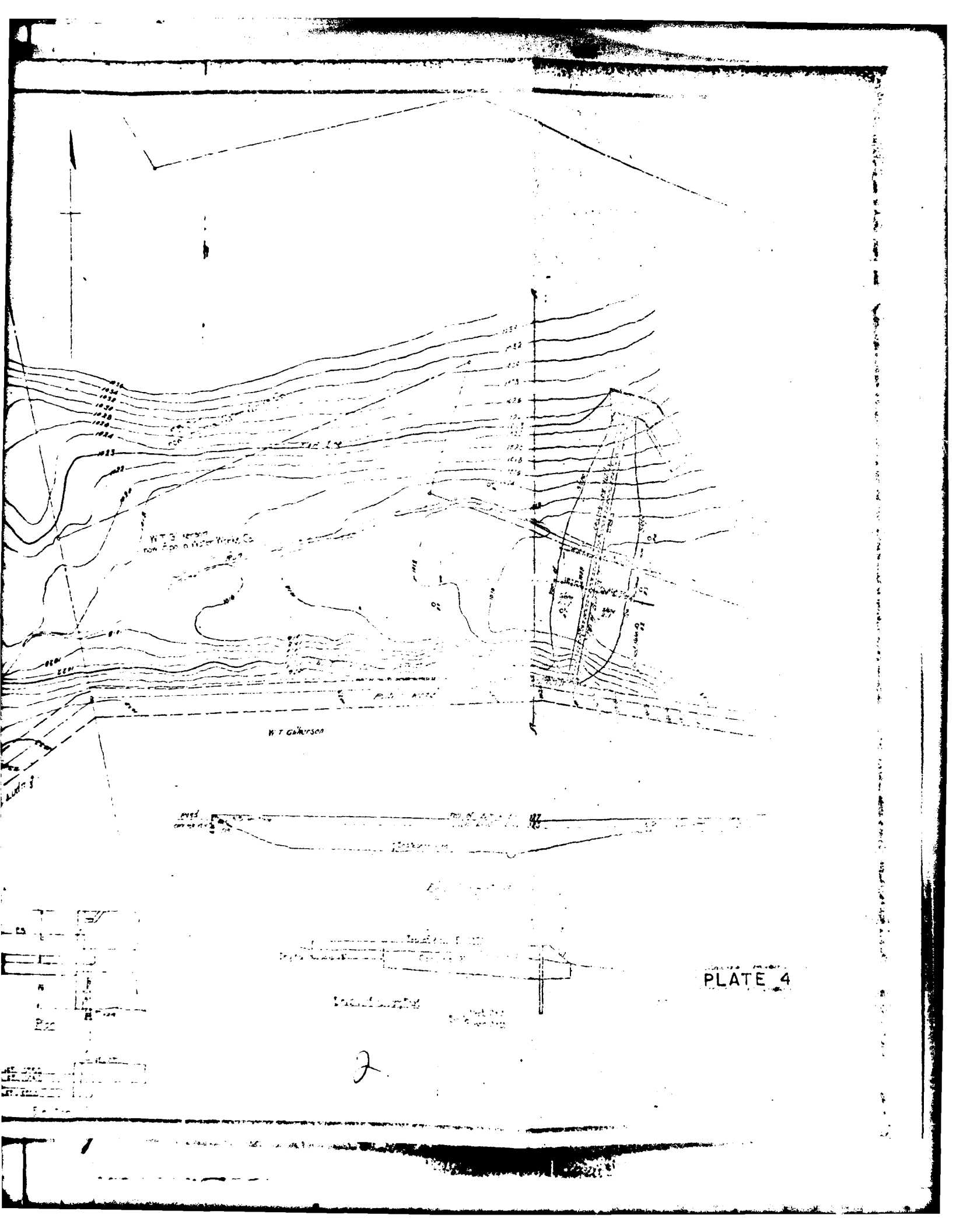


PLATE 4

2

APPENDIX F

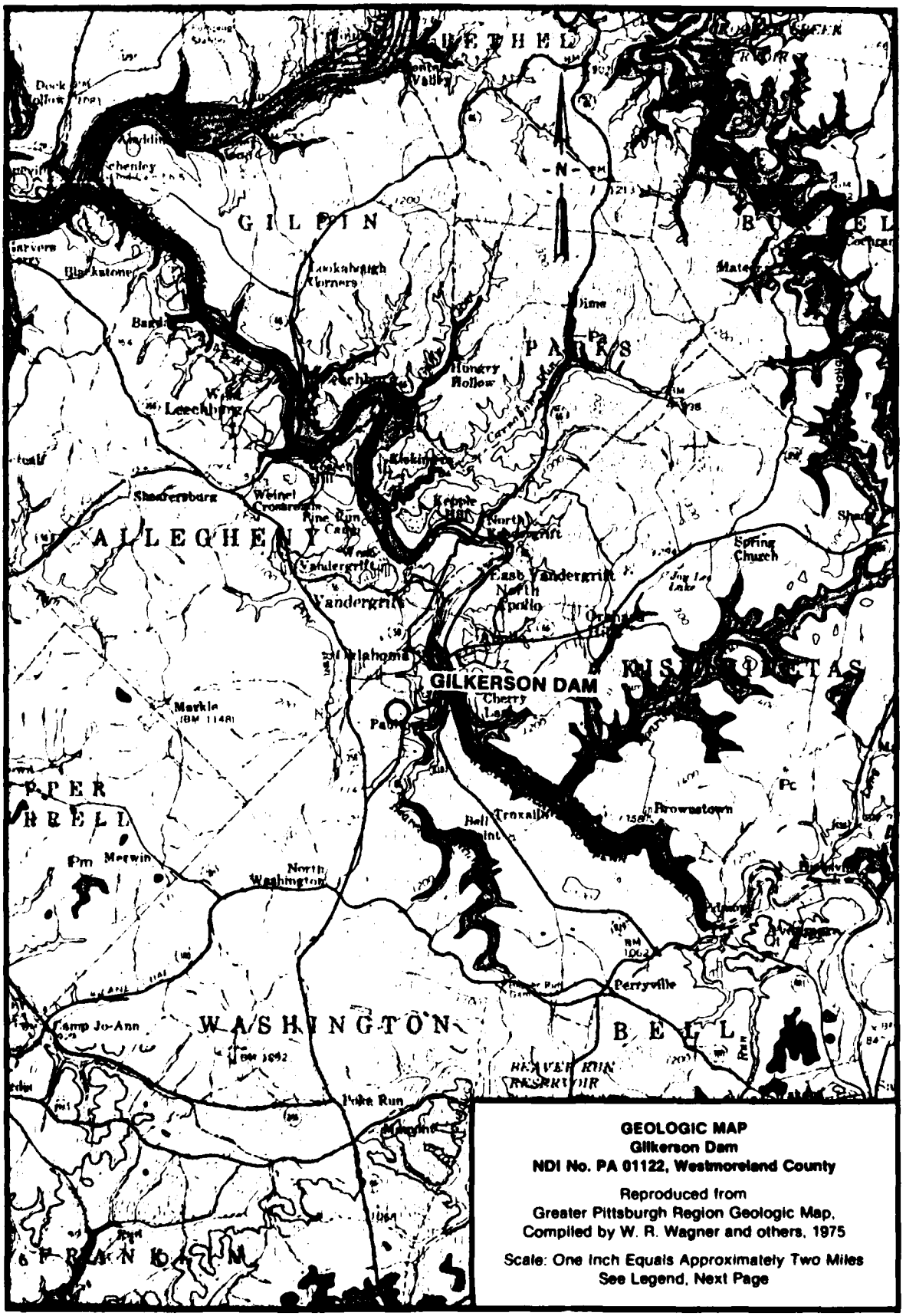
REGIONAL GEOLOGY

GILKERSON DAM
NDI No. PA 01122, PennDER No. 65-8

REGIONAL GEOLOGY

Gilkerson Dam is located in an unglaciated area of the Appalachian Plateaus Physiographic Province. Bedrock units below the dam are part of the Glenshaw Formation, Conemaugh Group, Pennsylvanian System. This formation consists of cyclic sequences of sandstone, shale, red beds and thin limestone, and coal.

The Upper Freeport coal is located approximately 200 feet (Elevation 820 feet M.S.L.) below the dam and has been mined only a couple of miles to the north of the dam site.



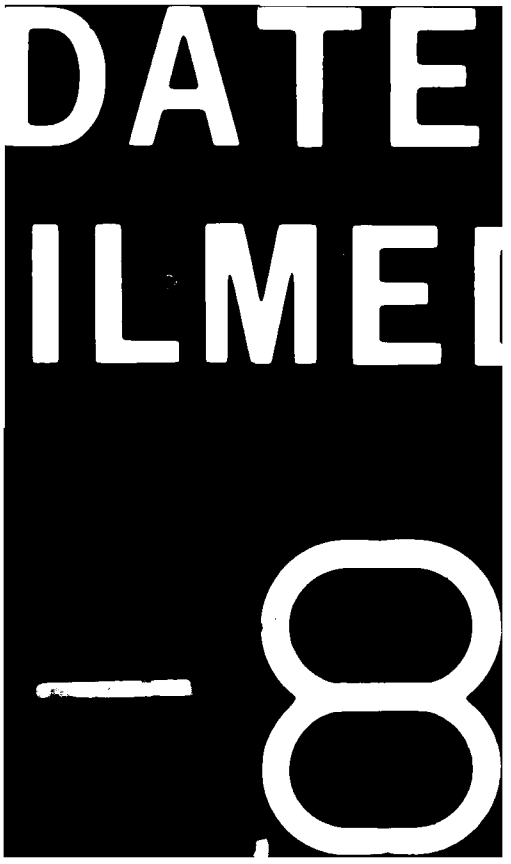
GEOLOGIC MAP
Gilkerson Dam
NDI No. PA 01122, Westmoreland County

Reproduced from
Greater Pittsburgh Region Geologic Map,
Compiled by W. R. Wagner and others, 1975

Scale: One Inch Equals Approximately Two Miles
See Legend, Next Page

GEOLOGY MAP LEGEND

GROUP	FORMATION		DESCRIPTION
	Alluvium	Qt	Sand, gravel, clay.
	Terrace deposits		Sand, clay, gravel on terraces above present rivers; includes Carmichaels Formation.
DUNKARD	Greene		Cyclic sequences of sandstone, shale, red beds, thin limestones and coals.
DUNKARD	Washington	Pw	Cyclic sequences of sandstone, shale, limestone, and coal; contains Washington coal bed at base.
DUNKARD	Waynesburg		Cyclic sequences of sandstone, shale, limestone and coal; contains Waynesburg coal bed at base.
MONONGAHELA		Pm	Cyclic sequences of shale, limestone, sandstone and coal; contains Pittsburgh coal bed at base.
P. CONEMAUGH	Casselman	Pcc	Cyclic sequence of sandstone, shale, red beds and thin limestone and coal.
P. CONEMAUGH	Ames		
P. CONEMAUGH	Glenshaw	Pcg	Cyclic sequences of sandstone, shale, red beds and thin limestone and coal; several fossiliferous limestone; Ames limestone bed at top.
ALLEGHENY	Vanport	Pa	Cyclic sequences of shale, sandstone, limestone, and coal; contains Brookville coal at base and Upper Freeport coal at top; within group are the commercial Vanport limestone and Kittanning and Clarion coals.
ALLEGHENY	Vanport	Pa	
POTTSVILLE			Sandstone and shale; contains some conglomerate and locally mineable coal.
Mauch Chunk			Red and green shale with some sandstone; contains Wymps Gap and Loyalhanna limestones.
Pocono			Sandstone and shale with Burgoon sandstone at top.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8